THE OIL WEEKLY

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The Oil Man's Calendar

JAN.	
12–13	Louisiana Engineering Society, St. Charles Hotel, New Orleans.
FEB.	
12–15	American Institute of Mining & Metallurgical Engineers, New York.
MAR.	
14–15	American Petroleum Institute, Mid-Continent District, Division of Production, Wichita, Kansas.
28–29	American Petroleum Institute, Southwestern District, Division of Production, Houston, Texas
31	Western Petroleum Refiners Association, Wichita, Kansas.
APR.	
10–12	American Association of Petroleum Geologists, Chicago.
11–12	American Petroleum Institute, Eastern District, Division of Production, Columbus, Ohio.
18–19	National Petroleum Association, Cleveland, Ohio
MAY	
18–25	International Petroleum Exposition & Congress, Tulsa.
26–27	Petroleum & Natural Gas Conference, State College, Pa.
27–31	American Petroleum Institute, Mid-Year Meeting, Ft. Worth, Tex.

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THE OIL WEEKLY

JANUARY 8, 1940

VOLUME 96 NUMBER 5

The Week's Panorama

As Congress convened January 3, it was the consensus of legislative leaders that the session would be controversial and long, extending into June or later—up to the national party conventions and possibly delaying them. . . . The oil industry will be concerned particularly with staving off federal regulation, as proposed in the Cole bill.

Business Outlook . . . . . .

Federal government economists connected with the Bureau of Agricultural Economics agree with those in private industry who foresee a higher average level of industrial activity in 1940 than in 1939. Such an increase would assure generally good business conditions, as 1939 proved to be a fairly satisfactory year.

However, the above agency and the Federal Reserve Board have hinted that the immediate future may bring some let-down in activity, having pointed out that new ordering is running under production, particularly in the steel and textile industries.

Forecast for Oil . . . . . .

Roger W. Babson, economist, forecasting for the New Year, said that the oil industry should enjoy in 1940 one of its best years, if it could satisfactorily deal with renewed overproduction and price cutting. He foresaw new peaks of consumption, with or without increased demand from the Allies. He pointed out, further, that the promised good results for oil companies would mean larger volumes of business for makers of oil field equipment.

Oil Earnings . . . . . .

Oil company earnings for the final quarter of 1939 were much better than for earlier quarters, and the closing three months will make 1939 compare favorably with 1938 for some concerns, although profits for the industry as a whole will be off probably 20 to 25 percent.

It is promised, moreover, that the first quarter of 1940 will prove substantially more profitable than the initial three months of 1939, when prices of gasoline and some other products were abnormally low.

For 1940 as a whole, the record of earnings will depend largely on the degree of success in holding down gasoline stocks, which threaten to be seriously burdensome at the beginning of spring, particularly if the winter proves severe. Bad weather would curtail gasoline consumption and at the same time force relatively large production, incident to meeting heavy demand for heating oil.

Markets: Strong, Weak . . . .

Conflicting trends continue in the oil industry's markets. Prices of Pennsylvania grade crudes were further increased 25 cents a barrel January 1, in response to the continued strong demand for lubricants, for both domestic use and exportation. The Pennsylvania grade postings have been advanced 75 cents a barrel in four increases since the beginning of October; and they are $1.07 higher than a year ago, Bradford oil being now $2.75 a barrel.

Markets for fuel oils and kerosene remain strong, with demand good and supplies moderate.

In contrast, gasoline prices have continued to decline, because of surplus stocks. Quotations have been lowered to the levels of early August, when a major company declared that low product prices necessitated the reduction which it made in crude price postings.

The depressed gasoline market consequently has adverse implications for crude prices outside the Appalachian region.

Allied Purchases . . . . . .

Rumors persist that British and French commissions for buying in the United States plan to increase purchases early in the new year. The expansion of buying will depend on the course of fighting, it is stated. Representatives of the allied governments have been discussing with United States officials means for avoiding booms in prices of non-military supplies.

Automobile Facts . . . . . .

Interesting figures on automobiles have been released by the Automobile Manufacturers Association. New highs were reached in 1939 in the number of motor vehicles in use, both here and abroad. Consequently, gasoline consumption also exceeded all previous records.

Motor vehicle registrations in the United States rose from 29,485,680 in 1938 to a new all-time high of 30,710,000 in 1939, including 26,250,000 motor cars and 4,460,000 trucks. These registrations were 68 percent of the world total of 45,000,000.

Registrations of commercial vehicles rose to 4,460,000 from 4,224,031. And buses in use reached a new peak of 134,000, against 132,600 in 1938.

Gasoline consumption by motor vehicles was estimated at a new high of 20,787,000,000 gallons for 1939, compared with 19,609,728,000 the year before.

Factory sales of motor vehicles in the United States and Canada in 1939 totaled 3,710,000, or 40 percent more than in 1938. That included 2,960,000 passenger cars and 750,000 commercial vehicles.

For 1940, further gains in automobile production and sales are generally expected. Most estimates of total output run between 10 and 15 percent over 1939.

Maintenance of High A. P. I. Gravities in the Production of Crude Oil

By R. L. HUNTINGTON, University of Oklahoma

THE petroleum engineer is realizing more and more each year the significance of conserving the lighter fractions in the crude oil. In the first place, there is often a price differential between low-and high-gravity crude oils amounting to as much as several cents per barrel between one price bracket and the other. In the second place, the loss of one degree A.P.I. gravity in most Mid-Continent crude oils results in a shrinkage of approximately 2½ percent by volume.[5]

Such losses in gravity can often be prevented by (1) treating crude oil emulsions at lower temperatures through the use of more chemicals or soap solutions, and (2) by proper separation and storage of crude oils. An understanding of the principles governing vaporization and condensation is essential.

Temperature Influence

In one case it was found that by treating a crude at a temperature of 110° F. the A.P.I. gravity of the crude proved to be 40. At this temperature it required 0.2 of a cent per barrel for the treating chemicals; however, by treating the same emulsion at 130° F., the clean oil dropped to 38° A.P.I. while the chemical cost was only reduced to .1 cent per barrel. The producer suffered a 5 percent loss in volume of high-gravity natural gasoline of 88.5 A.P.I which represents some of the most valuable motor fuel fractions in the crude. With $1.00 crude oil, this amounted to a loss of 5 cents per barrel due to the shrinkage and 2 cents per barrel on account of the lower-gravity oil falling within a different price bracket. The following calculation shows the method used in obtaining the gravity of the evaporated portion of the crude oil.

The 40° A.P.I. crude has a specific gravity vs. water equal to

$$\frac{141.5}{131.5+40} = 0.8251,$$

while the 38° crude has a specific gravity of 0.8348.

A material balance is used in the determination:

1 barrel 40° crude = .95 barrel 38° crude + .05 barrel evaporated gasoline or

$$\frac{\text{(lbs./bbl. of 40° crude)}}{.8251\ (8.33)\ (42)} = \frac{\text{(lbs./.95 bbl. of 38° crude)}}{.95\ (.8348)\ (8.33)\ (42)} + \frac{\text{(lbs./.05 bbl. of gasoline fraction)}}{.05\ (\text{Sp. Gr.})\ (8.33)\ (42)}$$

Sp. Gr. of gasoline fraction = .6425 or 88.5° A.P.I.

Where 8.33 = lbs. of water per gallon

42 = gallons per bbl.

Different crude oils will shrink in varying amounts per degree loss of A.P.I. gravity, according to the curve shown in Figure 1 in which the relationship between A.P.I. gravity of the gasoline lost is plotted against the shrinkage of the crude oil between 40° and 38° A.P.I. It can be easily seen from this curve that the shrinkage per °A.P.I. loss in gravity becomes greater the longer the crude remains in storage since the early losses represent the evaporation of the lighter fractions from the crude oil.

The oil producer who is forced to use high temperatures on certain emulsions which are not susceptible to the addition of chemicals or soap, can prevent the loss of the lighter fractions by using storage tanks which will withstand several pounds pressure, or the treated oil leaving the gun barrel may be cooled in an exchanger by giving up a part of its heat to the incoming stream of emulsion going to the heater. Figure 2. From this one example alone, the petroleum engineer can readily realize the importance of having a sound understanding of the principles governing vaporization and condensation.

Other Important Vaporization Problems

1. The petroleum engineer should know something about the solubility of the lighter hydrocarbons, such as methane, ethane, propane, etc., in crude oil at high pressures[2,4] in order to understand what is taking place at the bottom of wells which are being produced by gas lift.

2. The amount of vaporization of gas and gasoline from the crude oil should be studied as the oil is reduced in pressure through the oil and gas separators. It has been shown by investigators[1,3] that the A.P.I. gravity of the crude oil can be maintained at a higher level if the pressure is reduced in two or more steps through oil-gas separators rather than by one reduction only to the lowest pressure desired.

3. In the storage of crude oil, the inhalation of air into tanks is prevented by various devices, such as froth, floating roofs and breather bags. Tanks, which are not protected from the breathing in of air at night, lose the cream of the crude oil, namely the gasoline vapors, as the result of the tendency of these lighter hydrocarbons to escape into

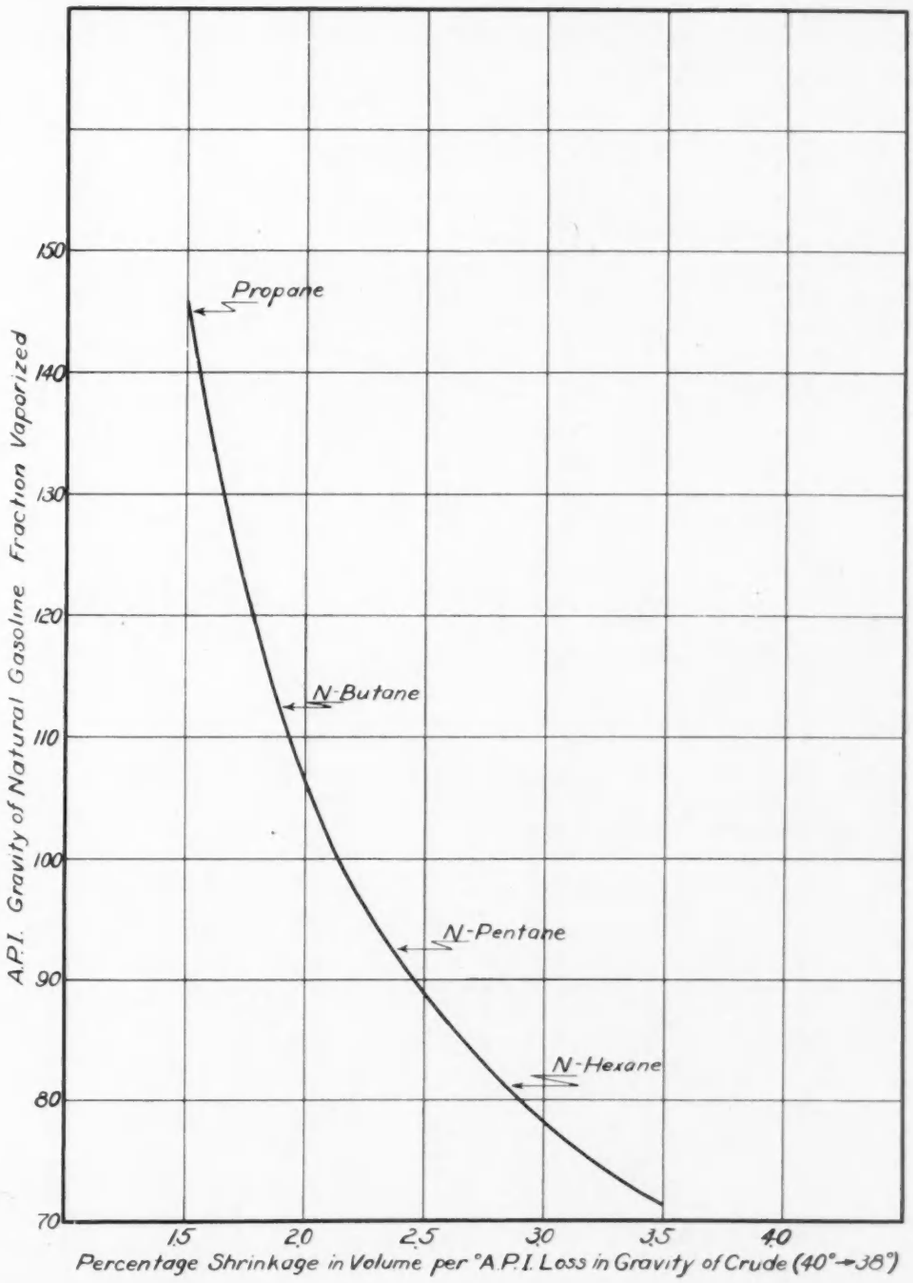

FIGURE 1
Relationship of A.P.I. Gravity (evaporated fraction) to volume percent of crude oil lost.

the space above the crude oil until their respective partial pressures in the vapor equal their partial pressures in the liquid. This inhalation of air, of course, reduces the partial pressure of each hydrocarbon above the crude oil. With the return of higher temperatures each morning, the exhalation of air is begun, but along with air goes the lighter gasoline vapors. With a breather bag connected to a tank, the vapors exhale in the daytime into the metal bag and return to the tank at night when the vapor volume above the crude oil contracts.

The Vaporization of Crude Oil

The separation of gases and vapors from crude oil tends to take place:

(1) Whenever the temperature of the crude oil is raised.

(2) Whenever the pressure above the crude oil is reduced. (Lower pressure ranges).

(3) Whenever an inert gas, such as air or steam is agitated with or swept over the surface of the crude oil.

The tendency for a hydrocarbon to escape from a liquid into a vapor state is generally termed the vapor pressure or fugacity of the hydrocarbon. This escaping tendency of the vapors is always offset by an opposite reaction known as condensation. When these two tendencies equal each other, equilibrium conditions are said to be established and this equilibrium pressure is the vapor pressure. Unless the oil is enclosed in a vessel so that all inert gases, such as air, are excluded, the vapor pressure of the pure material cannot be readily determined. If the oil should consist of one compound only, it would exert a definite vapor pressure at each temperature to which it might be heated so long as liquid and vapor consisting only of this one compound existed in the vessel. Crude oil, however, is generally composed of a large number of hydrocarbons having a wide

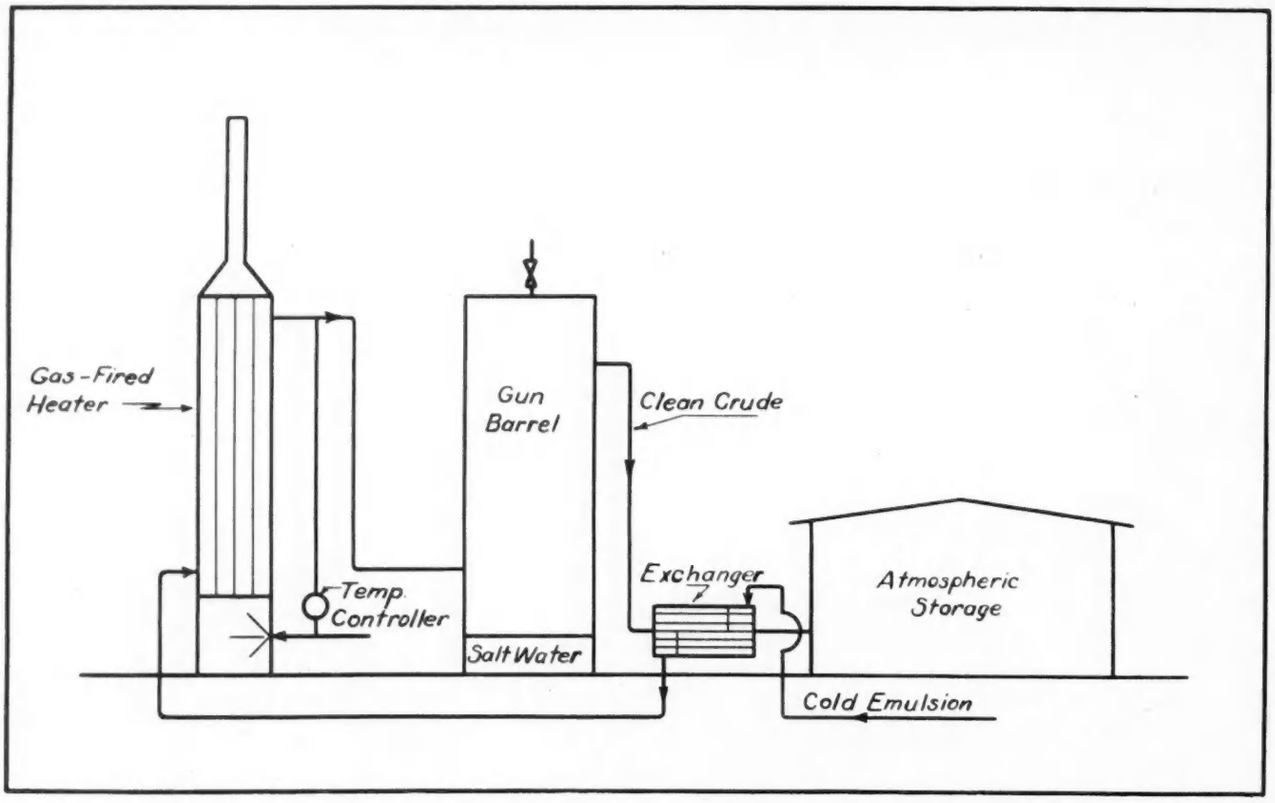

FIGURE 2
Treating System Designed for High Temperature Operations.

range of vapor pressures. Therefore when crude oil is subjected to any process which brings about vaporization, the more volatile hydrocarbons tend to escape at first, thereby changing the composition of the residual liquid. For this reason it is difficult to determine experimentally the vapor pressure of a mixture of hydrocarbons, unless the vapor space above the liquid is very small.

Raoults' Law

The equilibrium relationship between a gas or vapor and an oil is expressed mathematically by Raoults' Law. i. e.,

$$\pi y = px$$

Where π = Total pressure on the system in lbs. per sq. in. absolute.
y = Mol. fraction of any hydrocarbon in the vapor.
p = Vapor pressure of the same hydrocarbon in the pure state.
x = Mol. fraction of the same hydrocarbon in the liquid.
πy = Partial pressure of a hydrocarbon in the vapor.
px = The partial pressure of the same hydrocarbon in the liquid.

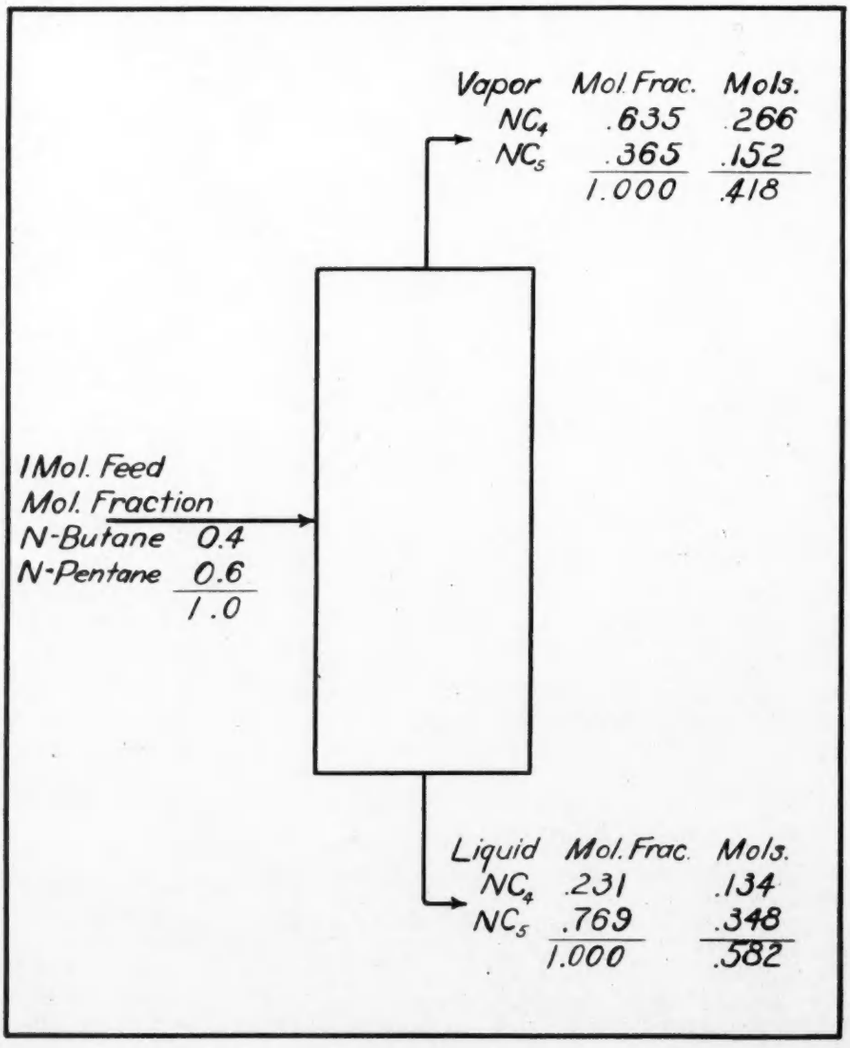

FIGURE 3
Partial Condensation of a Butane-Pentane Mixture.

The sum of the partial pressures in the vapor according to Dalton's Law is equal to the total pressure. The sum of the partial pressures in the liquid equals the vapor pressure at any one temperature. The total pressure on the system is equal to the vapor pressure when the vapor and liquid are in equilibrium with each other.

Equilibrium Flash Vaporization Calculations

The calculation of the vaporization of a crude oil can be simplified somewhat by considering the oil as consisting of several narrow range boiling fractions, each fraction having a definite vapor pressure. This information can be obtained by a distillation test in a true-boiling-point column of ample height to assure close fractionation of the crude oil. Knowing the average boiling point of the fractions, one can obtain from the literature the molecular weights and the vapor pressures of the several cuts.

To illustrate the method of calculating the vaporization of a simple system consisting of only two hydrocarbons, a gasoline fraction may be taken, consisting of 40 Mol. % N Butane and 60 Mol. % N Pentane. This gasoline is pumped continuously through a container maintained at 25 pounds absolute and 100° F. Take as a basis one pound mol. of the mixture. Since the particular conditions of temperature and pressure fall between the dew and bubble points for the mixture, a part of a pound mol. will vaporize, which can be designated as V. The remainder in the liquid will be (1-V) lb. mols. Let Y_v equal the mol fraction of either component in the vapor, X_L the mol fraction of either component in the liquid and X_f the mol fraction of either component in the original mixture. A material balance around the container for either component can be expressed.

(1) $X_f = V_{Y_v} + (1\text{-}V)\, X_L$

Since $Y_v = \frac{p}{\pi} X_L$ (from Raoults' Law $\pi y = px$)

(2) $X_f = V\left(\frac{P}{\pi} X_L\right) + (1\text{-}V)\, X_L$ Vapor pressure at 100° F.

Or (3) $X_f = X_L\left(\frac{P_v}{\pi} + 1\text{-}V\right)$ N Butane = 55 lb./sq. in. abs.

$X_f = X_L\, 1 + V\left(\frac{P}{\pi} - 1\right)$ N Pentane = 16 lb./sp. in. abs.

$$X_L = \frac{X_f}{1 + V\left(\frac{P}{\pi} - 1\right)}$$

In this particular case, the solution can be made in two different ways:

(1) Solve directly for the composition of the vapor and the liquid which are in equilibrium with each other inside of the vessel. From Raoults' Law it is known that the partial pressure of each constituent in the vapor is equal to the partial pressure of the same constituent in the liquid:

Part. Pr. in vapor		*Part. Pr. in liquid*
πy	=	$p x$

(1) N Butane $25\ y_4 = 55\ x_4$

(2) N Pentane $25\ y_5 = 16\ x_5$

Since the sum of the fractions in either the vapor or the liquid is equal to unity:

(3) $Y_4 + Y_5 = 1$

(4) $X_4 + X_5 = 1$

Equation (2) can be rewritten

(5) N Pentane $25(1\text{-}Y_4) = 16(1\text{-}X_4)$ or

(6) N Pentane $25 - 25\, Y_4 = 16 - 16\, X_4$

Adding (1) and (6):

(7) $25 = 16 + 39\, X_4$

$X_4 = 9/39 = .231$ mol fraction of N Butane in liquid condensate

$X_5 = 1 - X_4 = .769$ Mol fraction of N Pentane in liquid condensate

From equation (1) $Y_4 = \frac{55(.231)}{20} = .635$ mol. frac. N Butane in vapor

$Y_5 = 1 - Y_4 = .365$ mol. frac. N Pentane in vapor

From Figure 3 it can be seen that a material balance for either component will give a solution for the fraction of the stream which leaves overhead as vapor.

The material balance for normal butane is:

Basis: one lb. mol of feed

C_4 (1) (.4) = V(.635) + (1-V) (.231)

.169 = .404

V = .418 Mols of vapor per mol of feed

1-V = .582 Mols of liquid per mol of feed

The complete material balance can the be written as follows:

Component	Feed =	Vapor +	Liquid
	Feed X_f	V Y_v Mols	(1-V) X_L Mols
N Butane	$1 \times .4 = .4$	$.418 \times .635 = .266$	$+ .582 \times .231 = .134$
N Pentane	$1 \times .6 = .6$	$.418 \times .365 = .152$	$+ .582 \times .769 = .348$
	1.0 =	.418 +	.582

The other method of obtaining the percentage of vaporization is by trial and error, in which vaporization of V is first estimated and substituted into the equation

$$X_L = \frac{X_f}{1 + V\left(\frac{P}{\pi} - 1\right)}$$

If the sum of the fractions in the liquid do not add up to unity, successive trials are made until the satisfactory solution is obtained. This method is resorted to in the solution of partial vaporization of mixtures containing three or more components in the feed since the direct solution requires far more time in making the calculations.

In a later paper, an example of this type of multicomponent vaporization by trial and error or successive approximation will be presented in detail.

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Paraffin Formation and Removal by Mechanical Methods in Pumping Wells

Pumping Series Article No. 32

By BRAD MILLS, Associate Editor

FORMATION of paraffin in tubing, well-head connections and lead lines has been reduced or controlled in many pumping areas by effective pumping practices. Through analysis of conditions responsible for heavy paraffin deposits, operators have been able to change methods and equipment to advantage. In many pumping districts profitable pumping operations have become largely a matter of paraffin control.

The current study of paraffin in pumping wells involves several influences not recognized during earlier production periods. Low formation pressures necessarily present in pumping wells, slow movement of oil in tubing, water, motion of the fluid, loss of temperature, and mechanics are factors affecting pumping operations in the typical paraffin-producing area.

Several theories have been advanced to account for precipitation of paraffin from the oil under varying conditions. Chemists are not in full agreement on the reasons for its formation in tubing and surface equipment, since loss in temperature and loss of vapor from the oil each have a different importance to two schools of thought. Regardless of this controversy, the paraffin must be recognized as part of the oil that tends to coat equipment upon its liberation from the remainder of the crude.

Well Study Helps

The principal objective is to produce a well with the minimum accumulation of free paraffin, while the secondary objective is to remove the paraffin deposits with minimum time and expense after accumulation. Theoretically, there would be no paraffin problem if the oil could be produced under its full formation temperature and pressure.

The pumping well operator is much farther from this ideal condition than the flowing producer. The agitation and time element accompanying production of oil on the pump usually are enough to permit a decided loss of vapor and temperature, and with crudes of some types it is difficult to determine which loss causes the bulk of paraffin deposits.

Laboratory and field tests show that paraffin in certain light crudes does not congeal or precipitate principally from the full body of the oil. Its separation or sedimentation largely takes place after or during loss of the gases and lighter ends. A fresh, lively crude oil, even in a pumping well, gives minimum trouble when produced at a steady rate and moved or disposed of on short order.

Experiments were conducted some time ago in East Texas to determine the relative importance of the loss of lighter ends and loss of temperature, on precipitation of paraffin in light crudes. The results indicated that vaporization was a greater contributing factor than originally thought.

A closed sample of fresh oil showed no paraffin after standing at prevailing temperatures for a week. An open sample of the same crude showed a half-inch layer of paraffin on top of the oil after standing only 12 hours. The layer of paraffin was about the same thickness after seven days, indicating that the layer on top of the open sample had virtually stopped evaporation and the accompanying tendency for the paraffin to congeal in only 12 hours.

As a direct test of the effect of temperature drop on paraffin accumulation, two containers were filled with fresh oil. One was left open and the other closed, and both cooled to 18° F. After seven days, oil in the closed bottle was fluid and showed no free paraffin. The open sample showed a half-inch layer of paraffin on top of the oil and none on bottom.

Experiments Not Conclusive

These experiments indicated that in the case of East Texas crude oil the release of free paraffin in quiet samples was due to evaporation at the surface of the oil and not to loss in temperature. In other fields, especially in those producing heavier crudes, there is doubt that the same relative value may be placed on temperature loss and loss of lighter fractions.

Most of the early experiments conducted in the East Texas field affected only flowing wells, but many of the basic determinations were equally applicable to pumping wells. Doherty, Buchan and Reistle have written from time to time on paraffin problems in this area. Tests in surface lines particularly emphasized the need for avoiding stagnant areas, such as bull plugs and by-passes.

Oil standing quiet in test tubes undoubtedly does not reflect conditions in a pumping well. The early test-tube experiments in the East Texas field undoubtedly placed too low a value on temperature drop as a factor in accumulation of paraffin in tubing. Subsequently a group of engineers named temperature loss of oil as the principal cause for deposition of paraffin. The latter claim was advanced on the theory that the solubility of a given solid in a liquid increased with an increase in temperature, and that in the case of paraffin in oil, a decrease in the temperature lowered the ability of the fluid to hold the paraffin in solution.

Agitation a Factor

Observation of pumping wells showed that agitation tended to accelerate the accumulation of paraffin by causing small crystals to

unite. Pumping wells produced largely by agitation are affected more by paraffin than the straight pumping well, in fields producing an appreciable amount of gas with the oil. In wells of this type the oil contains some gas in solution when it enters the lower end of the tubing. Reduction of the pressure as the oil approaches the surface and the churning action of the fluid en route liberate the gas, and part of the oil flows from the tubing. A part of the tubing is periodically emptied and only a film of oil left on the surface of the pipe until a new supply of oil flows or is pumped into it.

In most of the deeper pumping fields paraffin accumulation is confined to the upper part of the hole and to surface equipment. The temperature near bottom in the average pumping field is high enough to keep paraffin in its liquid state. Cold streaks are encountered near the surface in a few fields, particularly in the vicinity of water sands. Paraffin accumulates rapidly in the upper part of tubing strings in some fields, while in other producing areas the rate of deposition is slow but fairly constant.

An oil-water emulsion sometimes increases the accumulation of paraffin. Free paraffin apparently finds its way into the emulsion, since the fluid contains a lower percentage of light fractions than clean oil, and gives a less cleansing action than water. Free water often minimizes the formation of paraffin, particularly where it has a temperature above 90° F. Water allowed to remain and cool in the upper part of the tubing often accelerates formation of paraffin. A washing action and satisfactory temperature make water a satisfactory producing agent in old pumping fields.

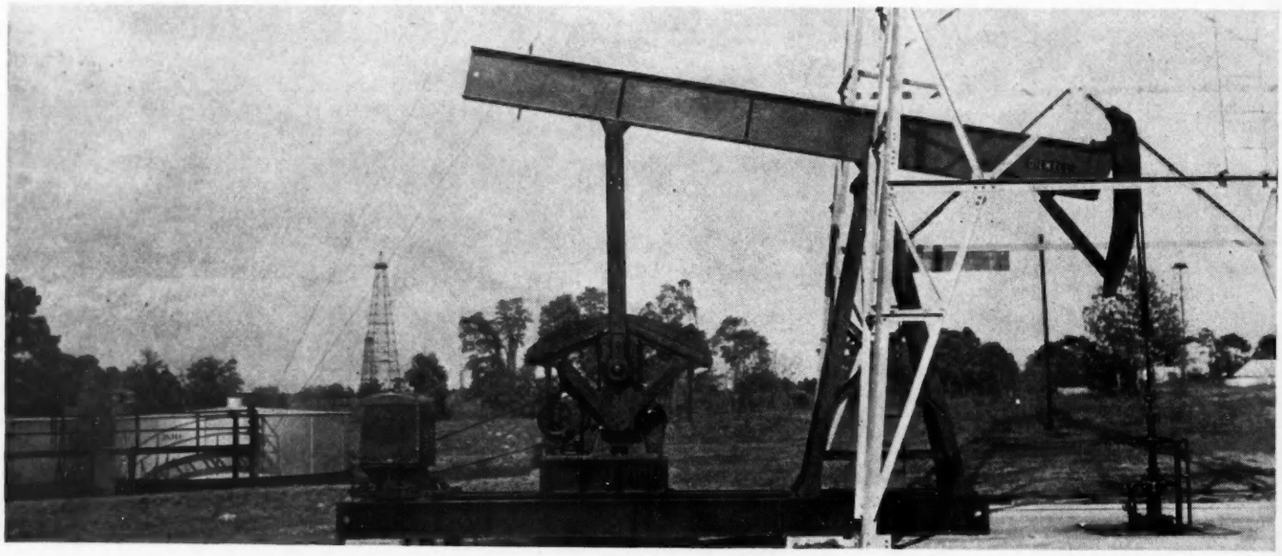
The gradual loss in formation pressure as flowing wells approach the pumping stage probably affects the nature of oil left for recovery on the pump. In several flowing fields paraffin gave little trouble and was easily controlled during the first production stage. The sharp loss of formation pressure apparently permitted much of the dissolved gas to escape and accelerated the precipitation of paraffin from the oil while it was en route to the surface through the tubing. Under such conditions the drop in temperature was a prime factor in paraffin accumulation.

Along the east side of the East Texas field a large number of wells are bothered with paraffin. It has been significant to note that as the bottom-hole pressure and fluid level declined the paraffin level also declined. In a few of the weakest wells the accumulation of paraffin apparently extended to the bottom of the well. The loss of gas from the fluid permitted the paraffin to precipitate from the oil at a much lower point in the hole than in flowing and higher pressure pumping wells. Gas comes out of solution at a pressure of about 750 pounds, and some of the weakest wells did not show a greater bottom-hole pressure.

In these weak wells the accumulation of paraffin affected the full tubing and rod strings, as well as the pumps. This precipitation of paraffin at a point near bottom partially supports the theory that loss of the lighter ends accelerates paraffin accumulation, even where the temperature seems adequate for holding it in solution.

One group of engineers that recognizes temperature loss as the chief contributing factor in paraffin accumulation explains the formation of paraffin at or near the bottom of wells with the theory that the fluid is cooled by the loss of lighter fractions to a degree

If paraffin can accumulate on the outside of a pumping wellhead to this extent, it must be much worse on the inside. Cold weather sharply increases the rate of deposition in surface equipment.



Operators who "get the jump" on paraffin can control the trouble in many pumping wells. This well is in the edge of the paraffin belt in the East Texas field, but no time has been lost because of paraffin accumulation.

that permits precipitation of the paraffin.

The fluid level in many of these weak wells is from 50 to 100 feet from bottom. Such a small amount of fluid is sharply affected by a simple pumping action, and agitation of the fluid undoubtedly influences the loss of lighter fractions in the oil in the well bore near bottom.

The formation of paraffin on the inside of both tubing and casing has been reported in a group of pumping wells along the extreme east side of the East Texas field. This acute formation is believed to be due to a number of cool streaks of fresh water sands found near the surface, and to limited production from the wells. Oil standing in the casing and tubing between pumping periods each day is slightly chilled by the water streaks, and precipitated paraffin clings to rods, tubing and casing at several levels. In a few wells the accumulation between the tubing and casing has been severe enough to give trouble during pulling of tubing.

Foreign Matter a Problem

The presence of foreign matter in oil has increased paraffin trouble in several fields. Such outside material as sand does not necessarily increase precipitation of paraffin from the oil, but it seems to afford additional surfaces on which the very small particles of paraffin may cling. These combinations of particles, in turn, build up paraffin deposits on rods and tubing faster than the same amount of paraffin would build when floating around in the oil as fine particles.

The reduction of loose sand has been beneficial in many wells producing paraffin crudes, indicating that paraffin tends to cling to the sand grains before becoming attached to the rods or tubing. The exact part sand plays in paraffin accumulation is not known in the average field, since it has been almost impossible to stop encroachment of sand in wells of the more troublesome type. Sand is damaging on its own account.

The action of paraffin in oil indicates that it will not ordinarily go back into solution when the temperature at which it precipitated out is reached. Free paraffin in a mealy state may remain as such under a temperature that might have been effective in preventing its original precipitation. The loss of light fractions from the oil probably increases the tendency of paraffin to remain as free paraffin, after it has gone out of solution partially from such loss.

It is largely the necessity for fighting for production in pumping wells that causes paraffin to give more trouble than in flowing wells. In gradually lifting the oil to the surface, paraffin has a greater opportunity to liberate itself than in high pressure flowing wells.

Mechanical Removal

Mechanical removal of paraffin from pumping wells has proved effective in several major producing districts, although low formation pressures in settled fields and the accompanying inability of wells to flow out dislodged paraffin has created problems not commonly found in flowing wells.

Cutting, scraping, drilling out and swabbing methods are being used extensively where the accumulation of paraffin has seriously retarded normal pumping operations. Use of steam has declined, but many operators are still trying to find a way to force steam to the seat of trouble. Live steam is effectively used in flow lines and surface equipment.

Simple devices have proved most effective in removing paraffin from pumping wells. Both patented and improvised assemblies recognize simplicity as a basic requirement. Use of mechanical devices to check or prevent accumulation of paraffin in tubing has reached an advanced stage in several areas.

Knives and scrapers run on small tools and wire line are effective in dislodging the paraffin, but difficulty has been encountered in flushing out the accumulated paraffin. The tools used are little more than a small cable tool outfit, consisting principally of a socket, jars, sinker bar and cutter or scraper. The assembly is run into the tubing on a small wire line, and in severe cases the paraffin is literally drilled out. This type of paraffin outfit, however, has been more extensively used in flowing wells than in pumping wells. In the higher pressure flowing wells, the formation energy readily flushes out the dislodged paraffin.

Small tools of this type may be

used satisfactorily in pumping wells that produce a warm, non-viscous oil, but they have not proved effective in many large producing districts. Where the paraffin accumulation is not excessive and the dislodged paraffin can drop down into the tubing, higher temperatures below the paraffin level usually melt the loose paraffin to make the scraping job effective.

In sluggish, low-pressure pumping wells, excessive scraping often packs the tubing with the dislodged paraffin. In wells of this type, alternate use of scraper and swab frequently gives satisfactory results. A limited amount of paraffin is scraped off, and immediately swabbed out.

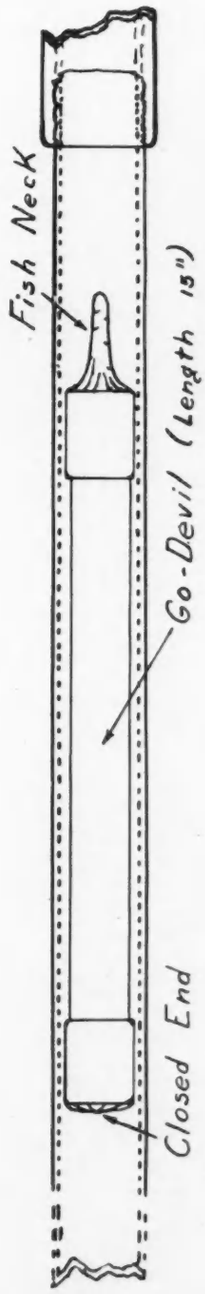
Removal of a limited part of the full paraffin accumulation has proved effective in pumping wells producing with small allowables. Magnolia Petroleum Company has been able to restore several of its most troublesome wells to a satisfactory producing level by swabbing out a few bushels of paraffin from each producer. The accumulation is gradual, and the removal not difficult because of the soft nature of paraffin deposits. The paraffin belt extends only to 1200 feet below the surface in the average East Texas well.

A steel paraffin swab recently developed has been successfully used in several fields. The swab consists principally of a steel bar bent to form a shoulder near the top, and a disc or scraper. It may be run on sucker rods or wire line, the construction being such that when the swab is run into the hole the disc or scraper rides downward on the shoulder. When being run into the hole the disc offers little resistance, since it stands almost on edge. In withdrawing the tool from the tubing, the disc or scraper drops down in a level position and scrapes the full diameter of the tubing. The scraper is made of a steel that bends and loses part of the load when the strain becomes excessive. The device acts as a scraper and swab.

Small Scrapers Help

Combination rod guides and paraffin scrapers have been widely used as a check against paraffin accumulation and as a scraper when pulling rods from the hole. Several types are manufactured but the function of each is similar.

In one type, the spiral flutes form a continuous bearing surface with the tubing, while allowing fluid passage through grooves. The turbulence generated by the flutes acts as a paraffin-expelling agent. One scraper coupling usually is used immediately above the pump as a guide, and others are placed in the rod string at frequent intervals through the paraffin belt.



This go-devil, used in open tubing, has 1/32-inch clearance collars and the I.D. of tubing. It scrapes the tubing on its downward course, and rides the fluid column to the lead line outlet when the well is produced with a submerged centrifugal pump.

Another type of rod guide and paraffin scraper commonly used consists of a short, square pony rod section with a box on each end. Two split sleeves or rings are placed close together on the short rod section, the openings in the sleeves being staggered to serve as a full scraper while allowing the fluid to pass upward. Scrapers of this type placed above the pump loosens paraffin ahead of the pump when pulling rods. Additional scrapers are inserted in the rod line through the paraffin belt.

Soft Rope for Swab

A simple swab has been used effectively in the East Texas field by Hunt Oil Company. A strand of soft rope is tied around the first or bottom joint of sucker rods so that the rod joint and rope pass through the paraffin accumulation in the tubing with limited resistance. After the rope and rods have been run a certain distance into the affected tubing, the short rod string is pulled. The soft rope that passed freely through the tubing when running the short rod section "balls up" or "wads up" to become a swab when the rods are pulled. The rope section is tied so that its many small strands enter the tubing parallel with the bottom rod joint. Reversal of the rods during pulling from the tubing causes the strands to jam from pressure against the paraffin. The wad of soft rope simply swabs a part of the paraffin from the tubing. Care should be taken not to get too big a "bite" of paraffin at one time. It is possible to run the rods down a short way into the paraffin and remove only a part of the paraffin at each run. The method is simple and somewhat primitive, but it has been very effective in removing soft deposits. A little practice provides a suitable basis for estimating the amount of paraffin that can be removed with each run into the tubing.

A short go-devil has been developed for removing paraffin in either flowing or pumping wells of a certain type. The device is self-operating, simple and effective in performance, but its application is restricted to wells with open tubing. Operators in West Texas and New Mexico fields found the go-devil or scraper useful in prevent-

ing accumulation of paraffin in tubing when lifting oil intermittently with submerged centrifugal pumps, electrically driven.

Many of the wells equipped with these lifts are located in districts particularly susceptible to paraffin accumulation, and instead of being operated continuously are produced only during a part of the day or over short periods. The go-devil is used only in exceptionally bad wells, since the motor of the submerged unit depends on the fluid in the well for cooling and the resultant heat of the fluid reduces paraffin deposition.

The paraffin scraper is essentially a piece of undersized tubing, closed at both ends. It is lowered into the open tubing and settles to a stop collar near the bottom of the hole, or below the paraffin zone. In its downward course it scrapes the inside of the tubing and dislodges the paraffin.

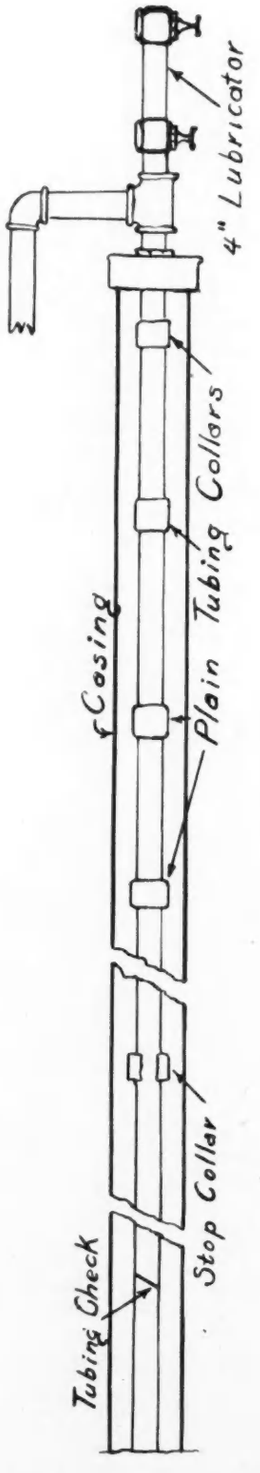
When the well is placed on production, the scraper rides the fluid column to the lead line outlet and comes to rest in a trap at the well head, clearing the tubing during its ascent. The device remains in the catcher while the well remains on production, but falls down through the fluid column again when the well is shut down.

The go-devil is made of a section of tubing 15 inches long with collars at both ends. The most effective collar clearance is about 1/32-inch, between the maximum diameter of the go-devil and the interior of the tubing string. The lower end of the device is closed as a bull plug. The top part of the go-devil is lengthened to form a convenient fishing neck.

A 4-inch lubricator is used on the well head, as an extension of the tubing. This lubricator permits removing the scraper. During normal producing periods the go-devil remains in this catch. The device is placed in the well by closing the lower valve of the lubricator and lowering the go-devil through the upper valve while the valve is open. The upper valve is closed, the lower valve opened, and the scraper enters the tubing immediately if the well is not producing, or as soon as the well is shut in if it is producing.

Simple Scrapers Used

Cutters and scrapers similar in design to "biscuit cutters" and branding irons used on cattle have been run on rods in efforts to dislodge paraffin in the tubing. Such scrapers simply fit closely in the tubing, and the ring forming the bottom carries designs that help to break up the paraffin, while permitting the skeleton assembly to slip through the tubing. Forcing the cutter into the tubing and pulling it out on the rod string serves to break up the paraffin but does not remove it at the time.



The lubricator-tubing arrangement is shown. The 4-inch lubricator holds the scraper when the well is producing.

Swabs Are Widely Used

Swabs of modified types have been used effectively for removing soft paraffin from tubing. Since the conventional swab is built to handle fluids, considerable tolerance must be provided in clearance. In the East Texas field soft paraffin is removed by swab from the tubing by "loading" the swab each time with only a small part of the total accumulation.

Steam has been used in various forms for loosening and dissolving paraffin in pumping wells, but the greatest difficulty has been in getting live steam to the source of trouble. Surface equipment and the upper section of the affected tubing yield to steam treatment, but rapid dissipation of heat and pressure at considerable depths adversely affects steam as a full cleansing agent.

An East Texas operator has been experimenting with hollow sucker rods, in an effort to use steam effectively through the full paraffin belt. The hollow rods obviously will carry steam, and theoretically at least will radiate enough heat to melt paraffin deposits or prevent formation of such deposits. Hollow rods will be used only to around 1200 feet from the surface, the maximum level at which paraffin ordinarily forms in the tubing. Frequency of use of the steam will be determined by experimentation. The steam will pass out of the rods into the annular space between the rods and tubing near the bottom of the hollow rod section, size of steam openings to be determined by the action of the steam in the hollow rods. The openings will be only large enough to prevent a radical cooling of the steam in the rods, a condition that would prevail in the case of hollow rods with no bottom openings.

Mechanical cleaning of lead lines has become a common practice in several fields. Straightening of flow lines and use of "easy" turns to separators and tanks have been contributing factors in the increased application of mechanics to removal of paraffin in surface lines.

Disposal of Oil Field Brines Acute Problem in East Texas

By MICHAEL J. LEAHY, Consultant

THE problem of disposing of oil-field brines without contamination of surface waters, or without destroying surrounding vegetation, always has been a problem; but it has become extremely acute in the East Texas oil field during the past year and a satisfactory method of disposing of the rapidly-increasing volumes of salt water being brought to the surface daily in this field must be found soon.

From the time of the first appearance of salt water in this field earthen dams have been built across small gullies and the salt water has been allowed to collect in these reservoirs until heavy rains cause the rivers to rise above normal. Then the salt water is released into these rivers at a rate which will keep the total concentration of salt in the rivers below 2000 parts per million. The serious threat now confronting the oil producers in this field is that because of the large number of reservoirs in the area and because of the fact that the past year has been excessively dry, but very little brine could be released into the streams. Hence, huge volumes are now accumulated in these earthen tanks and, due to excessive solar evaporation of the brine in these tanks, this brine is now highly concentrated. If sudden, heavy rains should fall in this section, the surface water would drain rapidly into these pits and cause them to overflow; and since the earthen dams are not provided with adequate overflow sluices, many of these dams might burst, thus permitting floods of concentrated brine to flow into the rivers draining this area.

Many oil producers are attempting to dispose of their salt water as it accumulates on the surface by pumping it into the water stratum lying about 50 feet below the oil producing horizon. There are two general methods in use. The first is that of drilling a brine-input well on the edge of the field where no oil is being produced. The brine from oil-producing leases in the vicinity is then pumped into a common reservoir located near this input well. Brine from this reservoir is then pumped into the brine-input well at a uniform rate. A study of this method will show that the minimum cost of drilling each brine-input well is not less than $16,000. Due to extreme corrosiveness of brine, the cost of the brine-gathering system required is excessive; and, finally, all brine must be pumped into the water stratum at a pressure exceeding the rock pressure at that point. The second method of formation-flooding is that of abandoning an oil well incapable of producing its allowable and then using it as a brine-input well. The brine brought to the surface from adjacent oil wells is then gathered into a reservoir from whence it is flumed through a complicated aerating system to a second reservoir. It is then pumped at a steady rate into the abandoned oil well. The brine must be aerated prior to being forced back into the oil sand in order to prevent plugging of the formation by the insoluble salts suspended in the brine which can be precipitated by such aeration. Hence while the expense of drilling a special well to serve as a brine-input well is obviated, the cost of the brine-aerating system is high. Therefore this second method is as costly as the first-named method.

Since there are no salable products recovered in either of these brine-input methods, the total cost per barrel of brine so disposed of is extremely high. It is therefore imperative that methods other than the use of storage tanks or of formation-flooding be studied and tested.

The author has spent several years studying and testing methods of utilizing oil-field brines.[1] As result of these studies and of laboratory work done on this problem, the author has developed several methods which show some possibilities.

Method A

While working on a wet process for making finely-divided carbon from natural gas, a burner was developed and tested in which natural gas could be burned while the entire apparatus was submerged in water. This special burner was modified to some extent and was then used for evaporating brine by submerging the burner in a vat of brine. The water was evaporated very rapidly and very efficiently by this means, leaving a black vitreous mass in the bottom of the vat. Although complete chemical analysis of this mass has not been made, it is assumed that it comprises fused sodium chloride and carbonate, calcium carbonate, tarry matter and finely-divided carbon. Tests show that it is insoluble in water, has a very high strength both in compression and tension, and is very difficult to fracture or grind.

Since this is an entirely new product, there are no developed markets for it; although there seems to be good possibilities that extensive markets for it could be opened quickly. The equipment required for utilizing this method on an industrial scale would be very

[1] For illustration read claim 9, U. S. Patent No. 1,995,545, March 26, 1935; and "Advances in the Utilization of Waste Natural Gas," in Petroleum Engineer magazine, Midyear number, 1935.

simple and inexpensive and, since huge supplies of waste natural gas are available in the East Texas oil field, the cost of evaporating brine in this manner would be quite low. It will be noted that no water, either wholly or partially treated, would be discharged from this process into flowing streams; also that no close chemical regulation of this process would be necessary.

Method B

A variation of the above described process was then tried. This comprised the use of a vertical flue in which were suspended strips of wool blanket. The upper portions of these strips were continuously immersed in shallow troughs of brine. In the base of this flue was placed one of the special gas burners described above. Evaporation of the brine occurred very rapidly because of the large surfaces thus exposed to direct contact with the hot combustion gases. However, it was soon found that incrustations of salts which formed on the lower portions of these blanket strips were extremely difficult to remove and that these woolen strips soon charred badly. Eventually these woolen strips were replaced by woven-glass blankets (fibre-glass); whereupon it was observed that the incrustations of salts would detach readily and fall to the base of the flue without any mechanical agitation of these blankets. Since these glass blankets are incombustible and chemically inert, no charring nor destruction from corrosion occurred.

The incrustations thus recovered comprised crude sodium chloride and no serious difficulties were encountered in purifying this crude salt. The equipment required to operate this process on an industrial scale would be simple and inexpensive. There would be no brine nor partially-treated water accumulate in the process as it is one of direct and complete evaporation. It would, however, be necessary to dispose of large volumes of crude salt to prevent accumulation thereof at the desalting plant; or else build and operate a salt-purification and packaging plant capable of handling the entire output of the desalting works.

Method C

In order to remove impurities from a liquid, recourse is frequently had to the principle of double decomposition in which one or more chemicals are added to the impure liquid in order that they may react with the impurities present to form two insoluble compounds; thereby causing total precipitation of both the impurities and the added chemicals. In order to remove salt from brine by double decomposition it would be necessary to form two insoluble compounds, one containing the sodium of the sodium chloride and the other containing the chlorine thereof. It is an axiom of chemistry, however, that the sodium compounds are soluble and that the normal chlorides are likewise soluble.

A careful search disclosed though that sodium bisulfite is practically insoluble in cold water and that silver, mercurous, cuprous, and lead chlorides are all insoluble salts.

With this information at hand experiments were conducted to determine if any combinations of chemicals with sodium chloride would produce one of these insoluble chlorides and sodium bisulfite. The process finally devised was that of dissolving lead sulfite in strong hydrochloric acid and then adding this solution to a weak solution of sodium chloride in the cold. Double decomposition occurred with the resultant precipitation of a yellowish powder consisting of a mixture of sodium bisulfite and lead chloride. However, such precipitation would occur only in the presence of an excess of hydrochloric acid. When actual oil-field brine was used in place of pure table salt, complete precipitation occurred without any excess hydrochloric acid being present and the precipitate settled very rapidly from the water.

Since sodium bisulfite is soluble in hot water and lead chloride is insoluble therein, the precipitate was washed with hot water, then allowed to settle, and the solution of sodium bisulfite was decanted from the insoluble lead chloride. The hot solution of sodium bisulfite was acidified with sulfuric acid and then cooled to precipitate the solid bisulfite. The brine thus treated was very low in total salts and was very clear.

In attempting to adapt this process to industrial treatment of brines, it should be remembered that lead sulfite and lead chloride are both very poisonous and that when in contact with wood sodium bisulfite imparts a very disagreeable taste and odor to the water. Sodium bisulfite is used in large quantities in making paper by the sulfite process; while lead chloride is used in the manufacture of other lead salts and in making pigments such as Pattison's white lead, Verona Yellow, Turner's Patent Yellow, etc., and is very expensive.

The equipment required to operate this process on an industrial scale would be comparatively simple and inexpensive in that this is a straight precipitation method and that it operates most satisfactorily in cold water. Also the precipitate has such a high specific gravity that it settles almost instantly in water. But it is impossible to purchase lead sulfite in commercial quantities, principally because this compound decomposes in the light. Thus it would be necessary to build and operate a plant at the site of the desalting works to make this lead sulfite and use it as it is made.

Method D

It is well known that hard water may be softened by passing it through a base-exchange material such as sodium zeolite and that the zeolite may be repeatedly regenerated by passing a solution of common salt through it. It occurred to the author that this process might be operated in reverse in order to treat oil-field brine. But zeolites do not materially reduce the total salts present in hard water. They merely change the insoluble calcium salts therein to soluble sodium salts. In the light of this fact it seemed to be a waste of time to experiment with this system of zeolite water-treating; because calcium salts would be even more injurious to fish than would salt water. It would also be necessary to prepare rather large volumes of artificially-hardened water containing no sodium salts for use in regenerating the zeolite after each cycle of purifying brine.

It so happened that it became necessary to make a study of base-exchange materials such as artificial zeolites for an entirely different purpose than that of treating brines. Consequently the literature on such artificial zeolites was at hand and a study of it was then made for the purpose of determining if double decomposition of brines could be accomplished with the use of any of these zeolites.

One of the methods of treating

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brines developed as a result of the knowledge obtained in said study is based upon the fact that cuprous chloride is insoluble in water. Oil-field brine was passed through a column of artificial sodium-copper zeolite of the proper mesh and the liquid leaving the zeolite tower was essentially a cupric chloride solution. This solution was then treated with sponge copper which quantitatively precipitated all the copper cations as cuprous chloride which settled rapidly from solution, leaving the effluent water in a very pure state. The cuprous chloride thus obtained compared very favorably with samples of a commercial product. An analysis of the chemical reactions involved in this developed process reveals that the chlorine of the sodium chloride migrates to the copper cation and the sodium thereof attaches itself to the copper zeolite; thereby changing it to sodium zeolite. The inactive sodium zeolite may be separately treated with a cheap copper salt to regenerate the copper zeolite and to recover a solution of a readily-salable sodium compound. There also is a large and varied market for cuprous chloride for use in extracting silver and nickel ores, for the manufacture of oxygen, and as an insecticide.

While it would be unnecessary to use much heat or any high pressures in this process, the equipment required therein would be more bulky and expensive than that used in Method C. It was also noted that while cuprous chloride settled very rapidly from solution when treating pure salt solutions, it settled slowly when treating brines from the East Texas oil field. This may have been due to the formation of some magnesium-copper salts which were comparatively light and flocculent.

Method E

Another method of treating oil-field brines by the use of artificial zeolites was developed as a result of the tests made with Methods C and D. This method is a rather complicated process in that the brine is percolated through a column of copper zeolite to form copper chloride solution. This solution is then treated with white lead which quantitatively precipitated the copper chloride from the water to form a mixture of solids comprising cupric hydroxide, lead chloride, and a lead-carbonate complex. The supernatant water so separated from these salts is very soft; but has a light-blue tinge due to the presence of traces of cupric hydroxide. This mixture of solids is treated with anhydrous ammonia to form a solution containing cuprous-ammonium hydroxide and ammonium chloride, and to precipitate white lead. After separation of the white lead so regenerated, the solution is then heated to drive off ammonia vapors and to precipitate cuprous oxide which is insoluble and hence may be separated by settling. The concentrated ammonium chloride solution remaining may then be evaporated to form sal ammoniac for which there is a ready market in varied industries. The white lead recovered in this cycle of operations is returned to the process for precipitating the copper chloride while the ammonia vapors are returned for use in forming cuprous-ammonium hydroxide. The cuprous oxide recovered may be dissolved in sulfuric acid and this solution may be passed through the inactive sodium zeolite to regenerate copper zeolite and to form a concentrated solution of sodium sulfate (Glauber's salt) for which there is a ready market.

Thus it will be observed that the raw materials that will have to be continually added to this process are anhydrous ammonia, some cupric oxide, and sulfuric acid. The products recovered will be ammonium chloride and sodium sulfate. While laboratory tests indicate that at least 95 percent of the chlorides present in oil-field brines may be removed in this process and that the treated water is very pure, the only manner by which the actual costs of treating brines by this method may be determined accurately is by actual pilot-plant operation for a period sufficiently long to compute the costs involved and the purity of the by-products and the water.

Other Studies

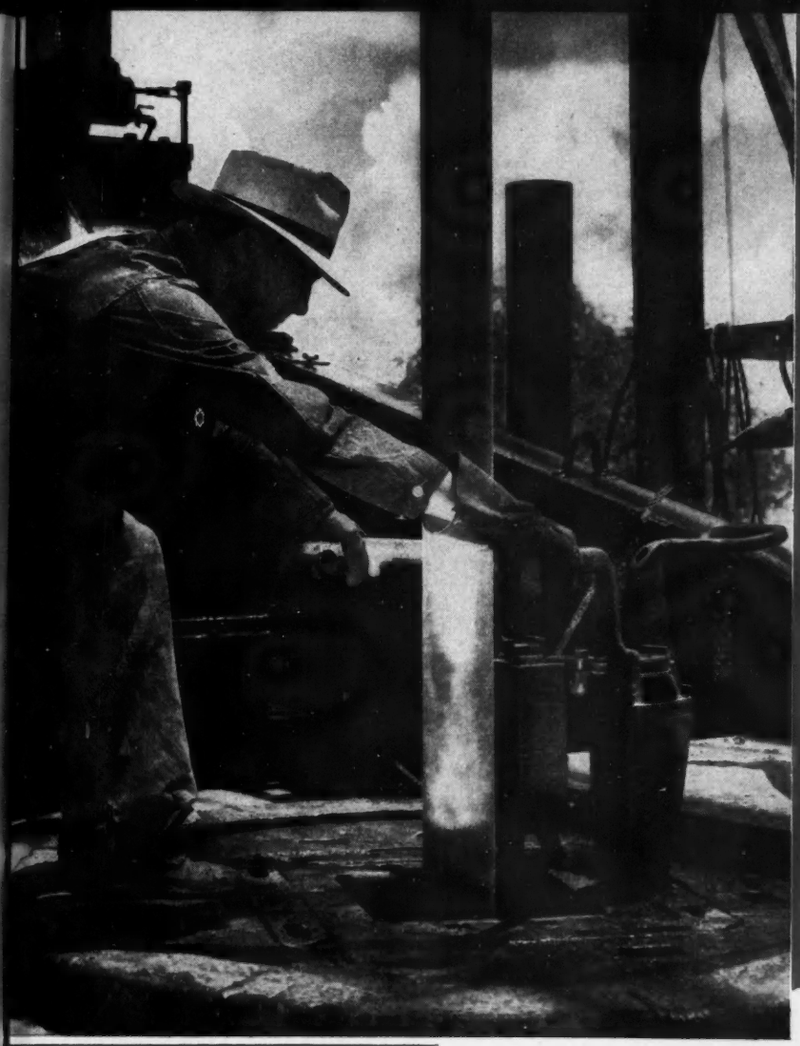
Several other methods of recovering salts from brines were studied, but none so studied seemed to offer any possibilities of being adaptable for large-scale treatment of oil-field brines. Therefore no extensive experimental work was done on any of these. Among the methods so studied, but not tested, was that of selectively separating sodium chloride from water by flotation methods in which a 5 percent alcoholic solution of oleic acid, or cupric acid, is used as a flotation agent. The sodium chloride should form a compound with this agent and this compound should float on the purified water. It is difficult to suggest any possible industrial use for this salt-fatty acid compound; although extensive tests might reveal some use for it or some method of converting it into a salable compound.

Another method is that of mixing lead oxide and lime with brine to produce caustic soda. For the past 80 years this method has been tested with very poor results by numerous investigators, not for the purpose of treating brines, but for the manufacture of caustic soda. Due to the fact that the mixture of concentrated brine, lime, and lead oxide must be heated to above 400° F. and still be maintained in a liquid state in order to promote the formation of caustic soda, excessively high pressures would be required. Since this mixture and the caustic formed are both extremely corrosive, this process would be impractical even if the above reaction could be made to be even 70 percent complete.

Also studied were numerous methods for the electrolysis of brine to obtain pure water. It appeared that several of these methods would be successful when desalting very dilute brines; but not for brine as concentrated as oil-field brine. One of these—the use of the Hydor 3-compartment cell—might possibly be used with success for oil-field brines if electric energy could be obtained in the field at very low rates.

Summary

Even though the apparatus used in making the described tests was of necessity very crude and no analytical control of the several processes was attempted, it is believed that sufficient information was obtained to justify pilot-plant testing of at least three of these methods; especially in the present grave emergency existing in the East Texas oil field. These pilot plants should have the same brine-treating capacities, should be operated on identical brines, and should be run for a period sufficiently long to determine their comparative efficiencies of treatment, cost of chemicals used, and the industrial



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values of all by-products recovered. This appears to be the quickest and most economical attack upon this serious brine-disposal problem.

From long experience the author has learned that seldom, if ever, can laboratory tests be exactly duplicated in full-scale industrial plants and that costs of operating such industrial plants cannot be estimated very closely from such laboratory data.[2] In this case, however, cost estimates were made by first assuming that the average connate water obtained from oil wells in the East Texas field contains 40,000 parts per million of sodium chloride and but very small amounts of magnesium or calcium chlorides. This means then that there are 11.2 pounds of salt in each barrel of these brines. Next, due to the fact that approximately the same total weight of chemicals recovered from each of the described methods would be about equal and that no really complicated machinery requiring constant manipulation would be required in any of these processes, it was assumed that labor charges would be the same, regardless of which process was used to treat identical volumes of brine. Hence, being equal, such labor costs could be of but small value when estimating the comparative costs of operating these processes. Next, preliminary designs were made of a small commercial plant and of a very large plant to operate each of these processes; and costs of equipment for each was determined. Finally, all these costs were reduced to the common basis of costs of raw materials, power and fuel per barrel of brine treated, capital investment required per barrel of brine treated per 24 hours, and values—at the plant site—of by-products recovered per barrel of brine treated. Table 1 summarizes these data.

TABLE 1
Costs and Income per Barrel of Brine Treated

Method	Raw Materials Power & Fuel	Capital Investment	Value of By-Product
A	$0.0153	$ 2.10	12.3 lbs. of solids of unknown value
B	$0.0141	$ 3.18	$ 0.22
C	$3.73	$ 3.85	$17.73
D	$2.35	$ 8.72	$ 3.64
E	$0.352	$11.28	$ 0.80

Using this table, if it is desired to determine, for example, the factors involved in building and operating an industrial desalting plant utilizing Method C to treat 5000 barrels of oil-field brine per 24 hours, the chemicals required (lead oxide, sulfur, and muriatic acid), cost of circulating the brine, and the cost of natural gas fuel required to evaporate the sodium bisulfite, would amount to $1865.00 per day. The capital required to construct this plant would be $3.85 times 5000 or $19,250. The gross income obtainable from the by-products recovered would equal $17.73 times 5000, or $89,650 per day, f.o.b. the plant in carlots. The income obtainable from this process seems to be outrageously large; but it should be recalled that one of these by-products is lead chloride, a comparatively rare compound which is currently quoted at 40 cents per pound, f.o.b. point of production; and the present market for this compound is very limited.

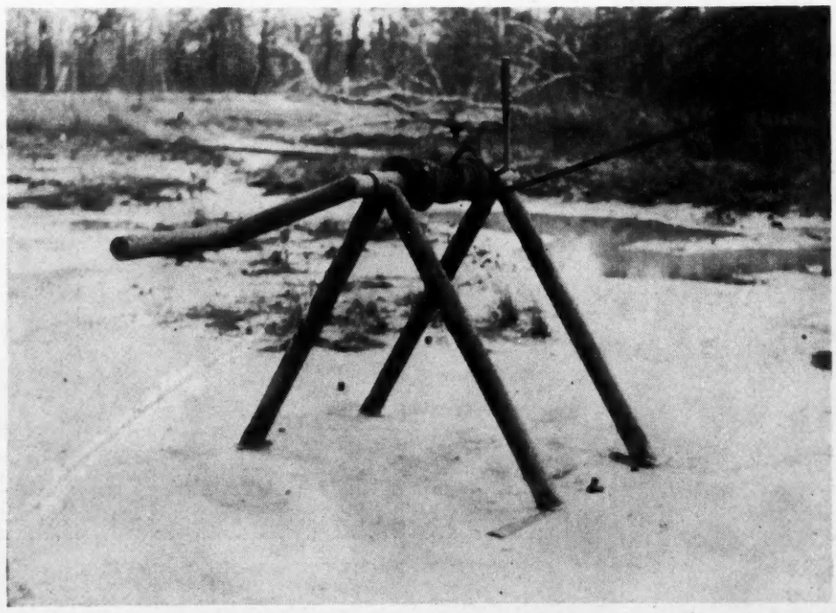
Regardless of the process used for desalting oil-field brines, it should be remembered that, due to the inexhaustible supply of such brine at no cost, the markets for any of the by-products recovered would soon become saturated unless rigid control was maintained over the total volume of these compounds entering the market. Such control of volume could be most readily accomplished through control of patents granted and patents pending on the processes and equipment used in each.

[2] "Profficient Procedure in Handling Industrial Research Problems," Michael J. Leahy, Petroleum Engineer, Vol. 5, No. 13.

Windlass for Adjusting Salt Water Overflow

BUILT up from 2- and 2½-inch pipe, a windlass for handling the "grasshopper leg" salt water vent from its lease tanks permits one major operator in the East Texas field to regulate closely the liquid level within his tanks, and at the same time permit the lower end of the vent line to swing clear—thus postponing the time when corrosion, rust and salt will clog the line and require attention.

Angle legs, carrying short sections of 2½-inch pipe at the junction, form support and bearing portions of the winch or windlass, the drum being merely an extension of the shaft onto which is welded the pipe crank. Holes drilled through one end of the drum shaft and the corresponding bearing section permit the drum to be pinned at any desired place, thus regulating the amount of free line and in turn controlling the height of the overflow pipe.



Pipe scrap forms windlass for adjusting height of salt water draw-off line—pin through drum and end frame permit close regulation of liquid level.

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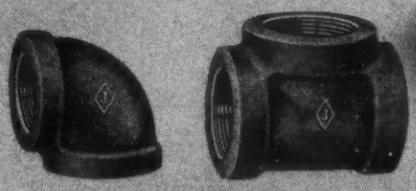

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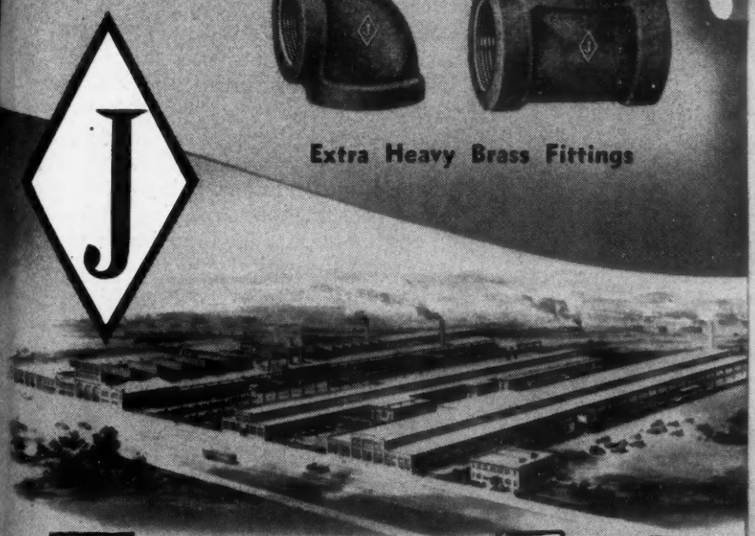

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Ten years bring out interesting pointers on operation of small lease in Oklahoma

Lease Electrified Ten Years Ago Still Going Strong

By W. C. LANE, Electrical Engineer

A STUDY of operating records may often reveal a number of surprises. The story the records tell does not always conform to general thought; in fact, sometimes completely refutes time-honored precedent. Such is the record of a 17-well lease in Drumright, Oklahoma, electrified 10 years ago and still going strong.

Elm Oil Company is the present owner of the lease, with 17 of 18 electrified wells still on production. Eleven of the wells are pumped 24 hours and 6 are pumped 8. The group produces 85 barrels of oil and from 600 to 800 barrels of water per day. Fluid level has receded until it now is practically at pay depth.

The lease was drilled in 1914 and 1915 and initial equipment was selected to conform with practices then in vogue. Four shallow wells were provided with jacks working from rod lines and central power and 19, then regarded as deep at 2600 feet, were pumped with rig front and gasoline engine for power.

In 1929 it became necessary to entirely revamp equipment. Production at the time had declined to an average 130 barrels of fluid per day. The tract, 155 acres, was L shaped, rough and rocky, and traversed by several gulches. A survey indicated declining revenues and increasing water volumes but it was found that only 18 wells required immediate attention. It appeared possible to recondition the lease and lease equipment and to produce at a profit, provided a means of revamping the property could be found that would not require too great an initial investment.

Old Equipment to Start With

At the time, the salvage yard of the then owner had recently acquired some electrical equipment, as well as a gas engine suitable for power. A used generator and switchboard were acquired at nominal cost. To make the proposition even more attractive the floor and foundation of an abandoned station could be readily adapted to use as a power plant. Salvaged line material was ample for powering the lease.

An engineer can foretell with a reasonable degree of accuracy the life and service to be expected of equipment under stipulated load and working conditions. But it is easy to overlook what appear to be minor factors at the moment but that assume importance at a later date. Consequently, his prediction may be far from correct. Any engineering prediction on this particular lease, taking into consideration all factors, would have been far from favorable. But results most certainly contradict this.

The power plant as finally constructed and in use at this time consists of a 100 Kva 480-volt 60-cycle 3-phase 257 r.p.m. generator, belted exciter and a 165-horsepower 180 r.p.m. 2-cycle horizontal gas engine. A flat belt drive is used to transmit power from engine to generator, the driven pulley being located on a stub shaft. The outer end of the stub shaft is supported by a pedestal bearing as a means to avoid possible generator-bearing trouble. Both engine and generator are old models, the latter having been built in the late nineties and the former had been in service 13 years before being placed on its present job. Ample gas for the engine is produced on the lease. For controlling the generator, the switchboard apparatus includes an oil circuit breaker, ammeter, voltmeter, frequency meter and a vibrating type voltage regulator.

Distributing System

The distribution system includes two feeder circuits supported on untreated 20-foot poles; two pin cross arms and pole top pins being used to support the individual wires. Each feeder is controlled by a fused knife switch located on the wall of the power house. One circuit is looped as the wire available

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was not large enough to carry the contemplated load without an excessive voltage drop. The lines to the wells are deadened on poles set about 40 feet from the units and service is supplied to the motors through underground conduit. Control equipment is located on these poles. When it came to the matter of pumping units it was decided to purchase speed reducers and to fabricate and assemble the samson post-walking beam structures from junk pipe. This work was done in company shops.

The speed reducers chosen are of the worm type having a gear ratio such that a six-pole motor gives a crank speed of 20 r.p.m. when coupled to the high-speed shaft. A combination rotary and "plumb bob" system of counterbalancing is used. One of the first units to be put in service was driven by an industrial type motor having normal starting and running characteristics. This burned out shortly as did two others of the same type. Upon the advice of the oil company's engineer the manufacturer then installed a high torque motor, added a light flywheel to the coupling, and no further trouble has been experienced. This motor has been in service about 10 years and is being operated 24 hours per day. It may be added that all future units were equipped with motors having about 10 percent slip and that none have burned out due to an overload in the succeeding years.

The lease has changed ownership during the operation period covered by this narrative and is now owned and operated by Elm Oil Company of Tulsa, but practically the same corps of men have been in charge of the equipment throughout the 10 years covered.

Four Men Operate

The lease is operated by four full-time men and a superintendent who had this and other properties in charge. The men work regularly 36 hours per week, three being 6-hour tour men and the fourth a combination shift breaker and roustabout. Obviously this does not make provisions for having a workman on duty at all hours so the schedule is arranged for off periods between the tours during which the plant and field operate without supervision. The shift routine is about as follows. When a man goes on duty he inspects the equipment in the power plant, makes the rounds of the wells, returns to the plant for a second inspection, makes a second round of the wells and then makes a third visit to the plant before going off duty.

The power plant supplies energy for pumping the 17 wells, operating a water well, a gathering pump, a shipping pump and for miscellaneous lighting around the warehouse and camp streets. The homes of the five employees and of five other houses located on the lease are supplied with energy for lighting, operating refrigerators, washing machines, irons and radios. Since no house meters are used it is needless to say that no one makes any particular attempt to economize. Obviously the lighting system constitutes an automatic alarm so that if any interruption of service occurs when on one is on duty it will be noticed.

During the time the plant has been in operation the only large item of engine expense was due to normal wear in the cylinders. In preference to reboring they were replaced with others designed to permit the exhaust to be carried vertically upward instead of downward and out horizontally. Repairs to the generator have consisted of new brushes for the slip rings and such minor items. It was necessary to rewind the exciter. It was found that more lightning protection was needed at wells so a visit was made to the salvage man where arresters were found to be available. A set was installed at each well and no further trouble has been experienced.

Negligible Down Time

To the writer the most remarkable thing about this installation is that it has been operated for 10 years by the regular pumpers and despite the fact that there has been provided no reserve power unit there has been a negligible amount of down time. It is believed that the thing which has contributed more than anything else to make this possible is that the plant is over-engined. The engine is of a type that is familiar to the average field man and no specialist is required to operate it and to make ordinary repairs. Mention was made elsewhere of the installation of a stub shaft and outboard bearing on the drive as a means to eliminate generator bearing trouble. The omission of this feature alone has, to the writer's knowledge, been the cause of much expense and down time on installations similar to this one. Contributing much to the record, doubtless, is the fact that few, if any changes have been made in the operating corps of the property during the 10 years.

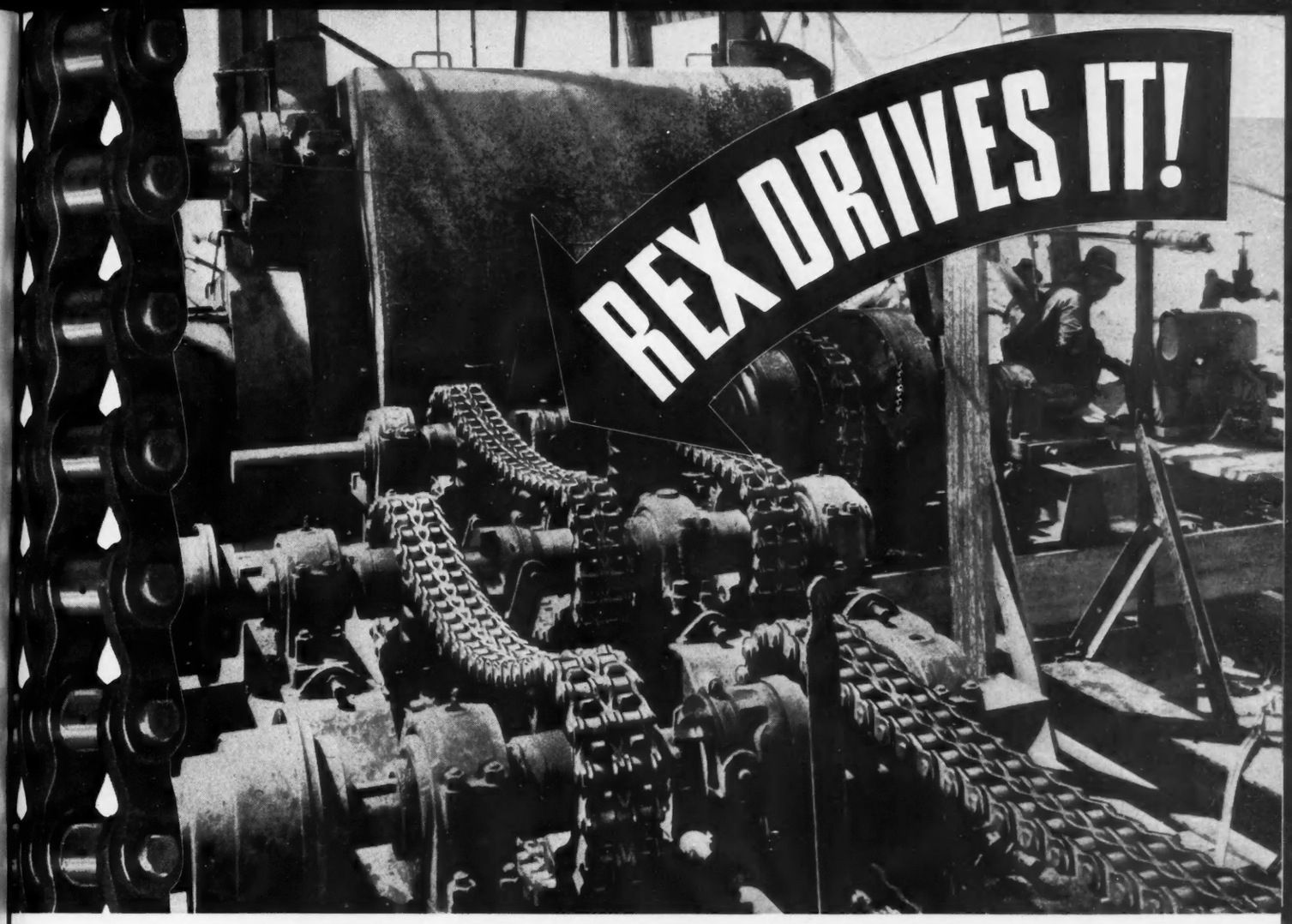
High-Slip Motors

The feature that is responsible for the successful operation of the wells is believed to be the use of high-slip motors. The only cases of motor trouble experienced since the installation settled down to routine operation were due to lightning and a broken gear shaft. In the former case it was necessary to rewind the motor and in the latter the motor was put back in service after new bearings were installed. In one instance cited by the operators a 5-horsepower high-slip motor was replaced by a 7½-horsepower motor of the industrial type for temporary use until repairs to the former could be made. Before it was realized that there is such a marked difference in the load capacity of the two types of motors when subjected to a pumping load the higher rated motor burned out. As an instance of the better adaptibility of the high-slip motor for work of this character a case was cited in which it required 8 minutes for a motor to bring a well up to speed. This occurred on a cold day when the grease in the worm-geared unit was stiff. No one familiar with the operation of industrial type motors can conceive of one of this type standing that amount of abuse and remain in service for 10 years.

Inside Motors Outside

All of the motors in use are of the open type intended for inside duty but have set in the open with no protection from the weather provided other than that offered by a rectangular piece of sheet iron bent in the form of an inverted U slipped over the yoke. There is nothing to prevent rain, snow and dust from entering from the sides. The control equipment includes a fused knife switch and a conventional type magnetic starter mounted in a simple wood cabinet. As in the case of the motors this apparatus is intended for inside mounting but despite this it is operating successfully in a box constructed with no attempt at weatherproofing.

But what can you say when faced with 10 years of operation without the loss of a bearing?



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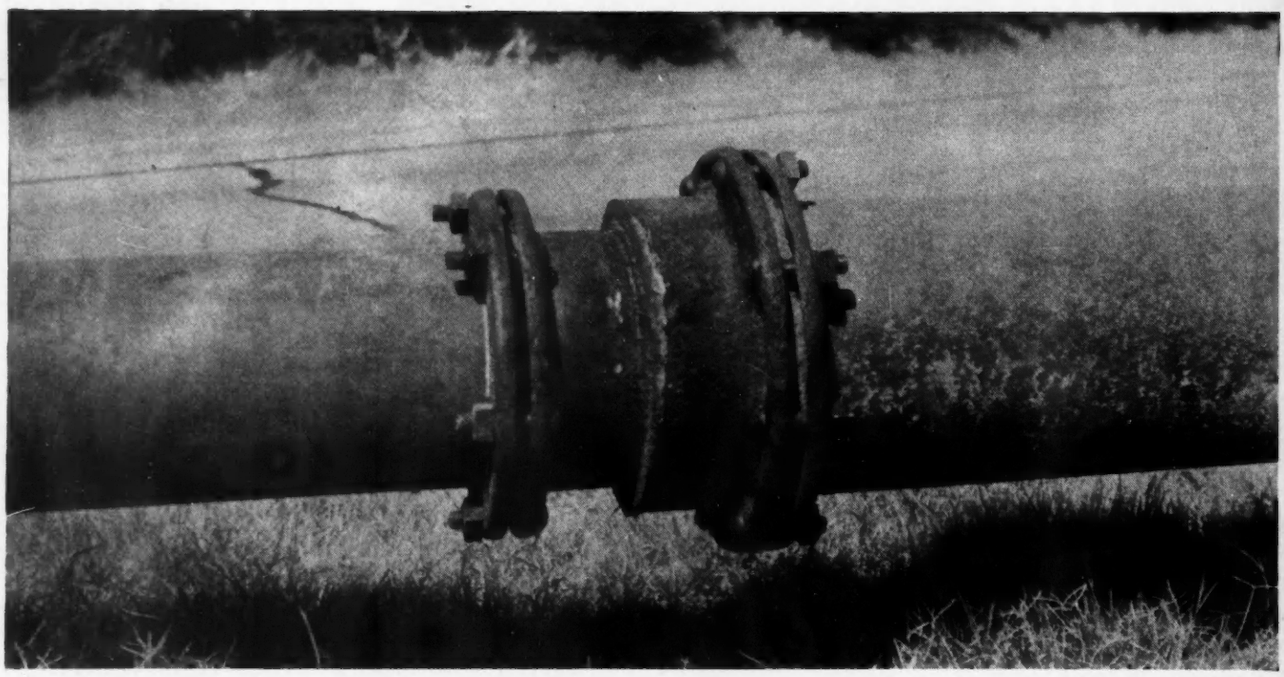

Double Pipe Minimizes Leak Danger at Road Crossings

A STANDARD type of construction for oil and gas pipe line road crossings has been developed by Cities Service Companies and affiliated firms that not only provides for easy replacement of the pipe but also for control of any leaks until permanent repairs can be made.

This crossing construction program consists of laying the regular pipe line through a larger conduit of casing that is sealed at both ends. The seal prevents losses until a permanent repair can be made, while the conduit saves excessive and difficult excavating.

The outer conduit or casing is invariably two inches larger than the size of the pipe line. For example, if the line is of 8-inch pipe, the casing is made of 10-inch. An adequate number of joints of the larger pipe are welded together so the ends will extend well beyond the road right-of-way, and the smaller, or actual flow, line is made up so that about half a joint will protrude beyond each end of the protective casing. It has been found that by using smooth type beads on the pipe line that there will be little interference when placing it through the protective conduit.

Positive Seal

To provide a positive seal for the annular space between the pipe and the casing that will at least temporarily prevent any loss through leaks that may develop, an assembly is made from sleeve couplings. Two long sleeve pipe couplings (one 8 inches and the other 10 inches in diameter) are cut in half so a reducer may be formed. A steel ring is then cut from either tank or boiler steel to the exact dimensions of the inside diameter of the 10-inch sleeve, and another one is cut to the outside dimensions of the 8-inch sleeve. After placing a clamp ring over both the 10- and 8-inch sleeves, the latter are slipped over the steel ring and welded to the cut steel ring.

After the 8-inch section of the pipe line has been drawn through the protective casing, the reducing long sleeve coupling is slipped over the 8-inch until the concentric ring connecting the two half sleeves is butted against the plain end of the 10-inch casing. Rubbers are then put in place and the bolts drawn up as if a common sleeve were attached to the pipe. By using clamp rings on each end of the reducing sleeve, short bolts may be used to make up the joint so it will be gas or oil tight.

After the crossing has been put in the ditch, risers are welded to each end of the protective casing that extend above the ground level. These vent risers are made so a collar and ells may be installed. During repair operations, the connections on the vent lines are removed and the collar either plugged or a gate installed to prevent loss of fluid.

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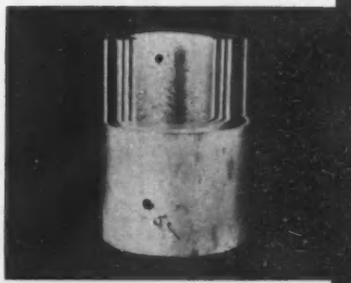


***PENETRATION**—To get through the casing and far out into the formation powder charges are regulated to give the alloy steel bullet maximum power with safety.*

Repressuring Successfully Retards Water Encroachment

By JOHN C. ALBRIGHT

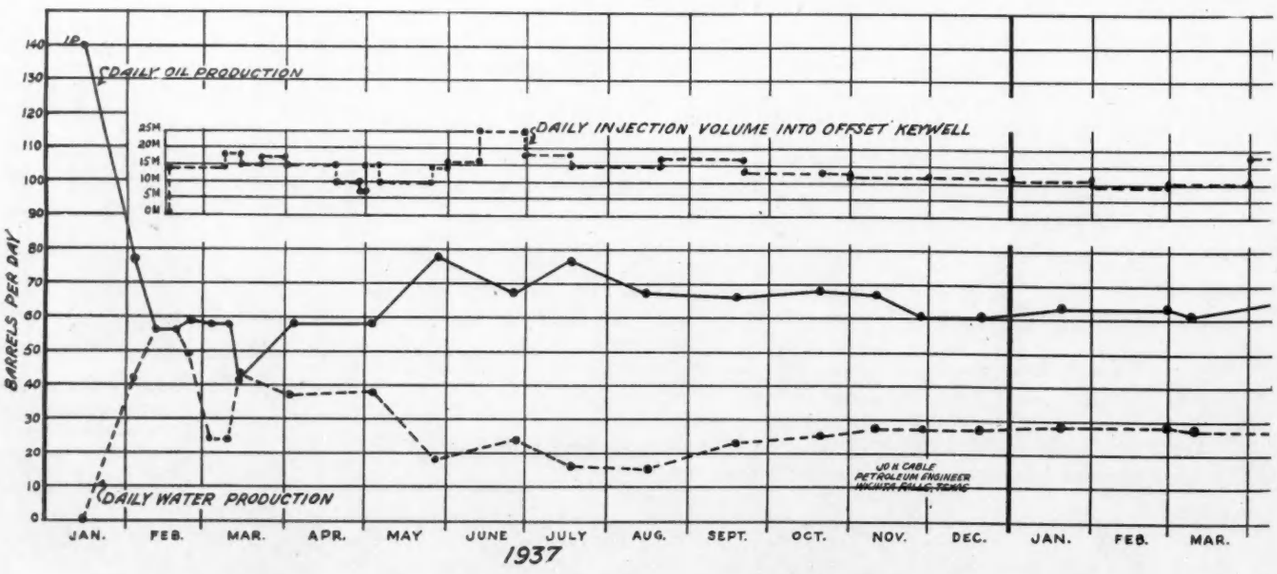
Daily water recovery is reduced and oil production increased by the injection of small quantity of gas into the pay horizon

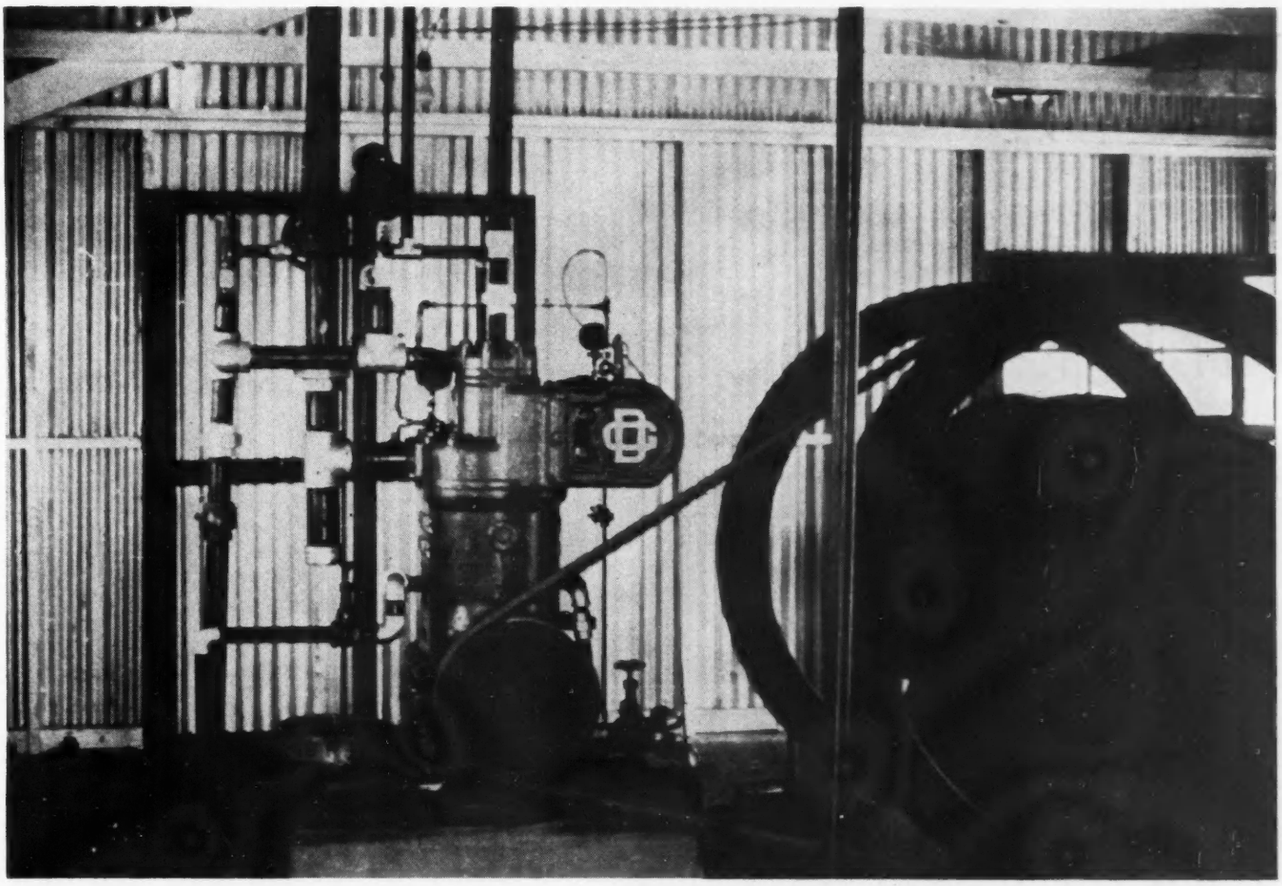
REPRESSURING projects are usually initiated to accelerate the the production recovery of a sand which already has produced a considerable quantity of oil, but the application of this process for the purpose of retarding or controlling water encroachment is being used successfully, in at least one instance. Not only have the repressuring operations increased the oil yield, but the water output has been reduced materially at the same time.

Golding & Cochran, of Wichita Falls, owners of a lease in the Olney district of Archer County, North Texas, completed a well on January 15, 1937, as a 140-barrel pumper. Production of oil began to decline almost at once, and water began to intrude at a rapid rate. By February 10, less than a month after the well was completed, oil production had decreased to approximately 55 barrels daily and an equal volume of water was being produced. It appeared water would soon drown out the oil entirely, so it was decided to try repressuring as a means of retarding its intrusion. A second well was begun 300 feet to the east, to be used as a key or injection well.

This well was equipped with a string of tubing set to introduce the gas into the lowest section of the producing sand, the Gunsite at about 1200 feet. A small two-stage vertical compressor belt driven from a four-cycle horizontal engine was installed. About 14,000 cubic feet of gas was injected into the key well daily, and had an almost instantaneous effect upon the encroaching water. By February 20, the water output had dropped to

Injection and Production Curves that Show the





Vertical type compressor in use at Golding & Cochran's Olney, Texas, repressuring project.

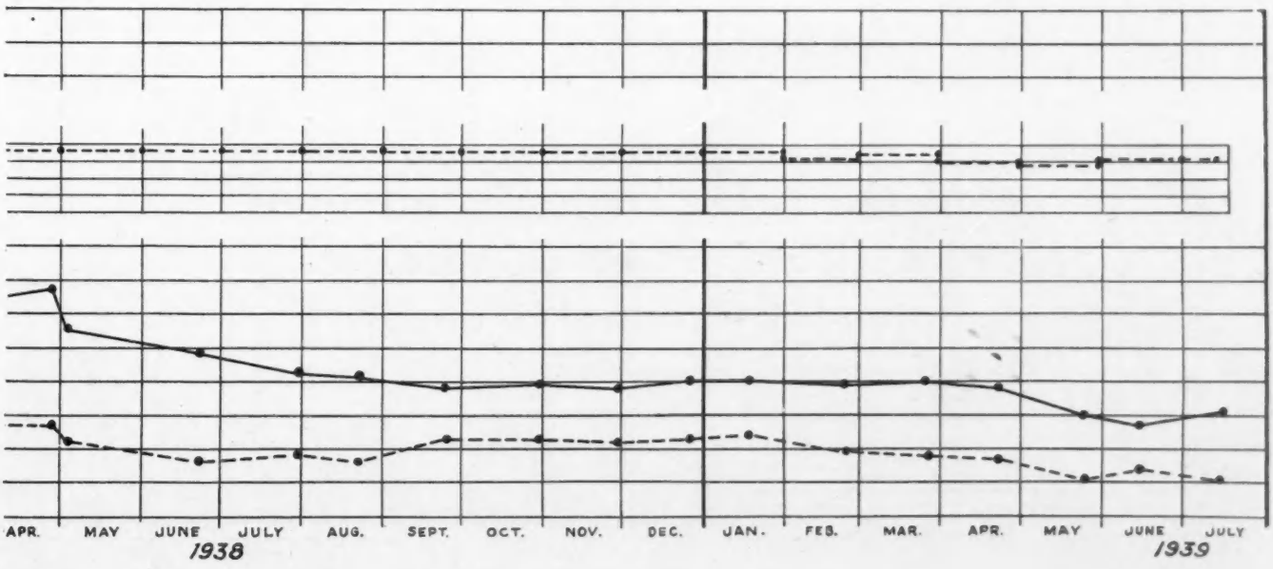
about 23 barrels per day while the oil yield was maintained above 55 barrels daily.

Experimentation until March 15, 1937, indicated the project would be successful, and by continuing to inject about 15,000 cubic feet of gas daily into the key well oil production was increased and the water output decreased to 20 barrels daily on May 25. At that time the oil recovery had increased to over 70 barrels daily, and continued at about that volume for the greater part of the next 12 months.

In July, 1939, daily water recovery was but 10 barrels and the oil output was 30 barrels.

Since the first well was drilled in 1937, eleven other wells have been drilled on the property, and three additional injection wells were being used at that time.

Effect of Repressuring on Water Encroachment



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HIGHLIGHTS IN THE WEEK'S NEWS

Legislation

Date for Cole hearings to resume not definite

Hearings on the administration's production-control legislation, abruptly halted in New Orleans last month by the death of Representative Carl E. Mapes of Michigan, will be resumed in Washington late this month or early in February.

Representative William P. Cole, Jr., of Maryland, chairman of the subcommittee in charge of the measure, is a member of the conference committee on transportation legislation which is to be disposed of as quickly as possible, and said last week that further action on the oil bill would have to be postponed until he was relieved of the other duty.

The first hearings on oil will be to take the testimony of the state officials who had planned to appear at the New Orleans session. They will be followed by further meetings, at which representatives of the industry will testify, and it is quite possible that the measure will not reach the floor of the house until March. If passed by the House of Representatives, it will then go to the Senate, where its fate will depend largely upon the length of the session.

Treasury sees nice gain in gasoline consumption and tax

General improvement in economic conditions during the past few months has resulted in an upward revision by the Treasury Department of its estimates of revenues from the gasoline tax for the current fiscal year, it was disclosed January 4 in the annual budget sent to the new session of Congress by President Roosevelt, in which he asked for $460,000,000 in new taxes to defray the expense of his Emergency National Defense Program.

Present estimate of the return from the gasoline tax is $221,600,000, an increase of $11,000,000 over the $210,500,000 estimated a year ago, and the revenue for the fiscal year which begins July 1, next, is calculated at $234,800,000.

Returns from the tax on lubricating oils, however, now are placed at $32,700,000 for the current year, less than the $33,400,000 figured a year ago, but for 1941 they are estimated at $36,300,000. From the pipe line transportation of oil, however, it is now calculated $12,300,000 will be secured, as against an estimate of $11,800,000 a year ago, and for 1941 the return is expected to be $14,300,000.

In asking that Congress provide $460,000,000 in new taxes, the president in his budget message made no specific recommendations as to how the money should be raised, but expressed the hope that "Congress will follow the accepted principle of good taxation of taxing according to ability to pay and will avoid taxes which decrease consumer buying power."

Revealing the expenditures which the various federal departments and agencies propose for the coming fiscal year, the budget disclosed that the Petroleum Conservation Division of the Interior Department will operate on its present scale, with an appropriation of $260,000 for enforcement of the Connally Act and other activities.

The Geological Survey is to receive $315,350 for enforcement of the mineral leasing acts, $350 more than the appropriation for the current year.

The Bureau of Mines is given a $100 increase in its fund for oil and gas investigations, for which it is to receive $260,100, and the Navy Department is to receive $71,620 for operation and conservation of the Naval Petroleum Reserves, an increase of $1620.

The special fund for the protection of the government's interest in matters affecting oil lands on former naval reserves is to be reduced from $26,500 to $25,850, due to a reduction in miscellaneous expenses.

While the budget cuts $100,000 from the Department of Justice appropriation for enforcement of the anti-trust and kindred laws, allotting $1,209,000 for that purpose for the coming fiscal year, no curtailment of the government's monopoly drive against the oil and other industries is foreseen, the reduction being confined almost entirely to the amount allocated for the employment of experts and professionals in the field.

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Allowables

Shutdown elimination before Texas commission January 18

Proposed elimination of shutdowns of Texas crude wells will occupy the Texas Railroad Commission during its next statewide hearing, set last week for January 18 at Austin. The commission announced during its last statewide hearing that, effective February 1, all Texas oil fields would be placed on a seven-day basis.

Also left over from the last hearing are complaints of operators along the west edge of the East Texas field, complaints to the effect that the new proration order is preventing them from getting a fair share of the oil. Revision of the East Texas order to give these operators an equitable portion of the oil produced presents a serious problem, and it was significant that no practical plan was suggested that would not cause endless adjustments throughout the field.

It is the seven-day operation, however, which promises to give the most trouble. The commission has announced that it plans to limit Texas production to consumer demand as estimated by the United States Bureau of Mines. If this policy is followed consistently, individual well allowables must be lower and lower, as new wells are placed on the proration schedule.

By indirection, that is, by closing fields down two or three days a week, the commission has reduced allowables for many wells below the statutory provisions of the marginal-well law. According to the proration schedule, however, the wells still get the marginal allowance, and in many cases more than this amount. It is by this means that the commission had in effect on December 30, allowables totalling 2,222,704 barrels, while operators were actually permitted to produce an average of 1,362,303 barrels daily.

To institute a proration schedule that would provide allowables totalling only 1,362,303 barrels a day, the commission must cut below the marginal well allowances as set up in the statute. This is the issue with which it is faced, and it is this which is likely to prevent any change from the present system in the immediate future.

While the Texas Railroad Commission is not evading law suits, it certainly is not searching for them. Many operators have indicated that if allowables for the wells are scheduled below the marginal limits, they will file law suits. With the East Texas troubles before them unsolved, the commissioners are undoubtedly willing to delay as long as possible any attacks from a new angle.

That schedules would be revised to the seven-day basis on February 1, seems more and more doubtful as the day approaches. Not only are there legal difficulties, but

mechanical problems arising from the preparation of new schedules are serious. It is estimated that approximately a month would be required to make the necessary calculations needed to determine well allowables on the basis proposed. The commission has called its hearing for January 18, and even though an order is issued on that day, it is doubtful that the new schedules could be prepared by the first of the month.

Meanwhile, complaints continue to come in from operators who are producing only five days a week and who object strenuously to the exemptions granted other operators which allow them to produce seven days a week. Because these complaints pile up, and by their very numbers constitute an argument which must be considered more and more seriously, it is evident that the commission must act eventually to correct the evils alleged. How and when it can be done is yet to be decided.

Kansas allowable cut

January crude allowable for Kansas has been fixed at 160,600 barrels daily by the Kansas Corporation Commission. This figure equals that forecast by the Bureau of Mines but is 7400 barrels under the December allowable.

Gas allowable for Otis field, Rush and Barton counties, was set at 10,540,000 cubic feet; 749,000,000 cubic feet for Cunningham field, Pratt and Kingman counties; and 279,000,000 cubic feet for Lyons field, Rice County.

These allowables became effective January 1.

Courts

Rowan & Nichols attack East Texas proration order

Another attack on the new East Texas proration order was presaged by a petition filed last week with the Texas Railroad Commission by Rowan & Nichols Oil Company, successful litigant in an attack on the old proration order, asking that the allowable on its Todd "A" lease in the East Texas field be adjusted. The complaint alleged that the lease was not now getting a fair share of oil.

This procedure is identical with that the company followed in bringing its first federal court suit on East Texas proration orders. In the event the new application is denied, it is believed a suit will be filed. The preceding suit involved the company's Todd "B" lease, which is now operated, so far as allowable production is concerned, under a federal court injunction. Rowan & Nichols won in both district and federal courts. The Railroad Commission is now planning an appeal to the United States Supreme Court.

Plead not guilty to West Coast indictment

Pleas of not guilty were entered on behalf of six companies charged with conspiracy to violate federal anti-trust statutes during a hearing before Federal Judge Paul J. McCormick at Los Angeles last week. Three companies had previously entered similar pleas.

Other defendants, who allegedly conspired to artificially raise and maintain gasoline prices on the west coast, filed demurs to the indictment, or asked for bills of particulars detailing the charges. Judge McCormick set argument on the demurs for February 13.

Companies entering not guilty pleas last week are Exeter Refining Company, Fletcher Oil Company, Inc., General Petroleum Corporation, Gilmore Oil Corporation, Shell Oil Company, Inc., and Norwalk Oil Company. Those who had previously entered similar pleas are Mohawk Petroleum Corporation, The Petrol Corporation and Eagle Oil & Refining Company.

PIPE LINE NEWS

Sinclair laying 66 miles of 8-inch pipe in North Texas

Sinclair Refining Company has authorized the first pipe line project for the new year in North Texas that will provide more crude outlet for the K-M-A and Hull-Silk deep lime areas. Construction bids will be accepted this week by the company's Fort Worth district office for the laying of 66.4 miles of 8-inch welded line from K-M-A station near NEc block 38, P. Castleman Survey, Wichita County, via the Hull-Silk field to Henry Station, Jack County, where connections will be made with its Mid-Continent-Mexia-Houston multiple system.

The new unit will parallel a 6-inch carrier completed last May to relieve congestion at K-M-A, and is to be a service by April 1.

An extra pumping unit is to be installed at the K-M-A station to raise the total capacity of the enlarged system to 23,000 barrels daily. The program calls for the addition of more units at this station and also at the Predo intermediate station, southeastern Archer County, as development of the district two most important field progresses.

Gasoline line, Corpus to San Antonio, completed

Magnolia Petroleum Company is making final pressure tests on its 139-mile gasoline pipe line, extending from barge terminal and storage center near Corpus Christi to San Antonio. Welding work on the carrier, which comprises 119 miles of 4-inch and 20 miles of 6-inch pipe, was completed last midweek. Using 2 booster stations, the line will have a capacity of 4500 barrels daily. It will replace a smaller line that has been delivering gasoline from the company's Luling refinery to San Antonio.

Stanolind Pipe Line Company plans 130-mile line in Kansas

Stanolind Pipe Line Company will start work in February on construction of a 130-mile crude oil line, consisting of 8- and 10-inch pipe. The line will originate in the Bemis pool of Northern Ellis County, Kansas, and will terminate by joining the company's line coming out of Ft. Laramie, Wyoming, at the Washington Station in Northeastern Kansas. By May this pipe line is expected to be in operation and will supply the outlet for Bemis pool as well as unconnected pools in Russell and Ellis counties.

Stanolind Pipe Line Company has one line into Bemis pool, extending through Gorham and El Dorado to the company's station at Humbolt, Kansas. The present line has been operating at capacity. The new project will handle over 25,000 barrels per day.

Line would move Rodessa gas to East Texas field

Construction of a 10-inch gas pipe line from the Jefferson end of the Rodessa field in Marion County, Texas, to the East Texas field is being considered by W. B. Bennett Construction Company of Houston. The gas would be used to repressure East Texas field wells.

Make inspections of pipe coatings after 10-year trial

Final inspections of the pipe-line coatings installed in 1930 in the tests undertaken jointly by manufacturers of protective coatings, the American Petroleum Institute, and the National Bureau of Standards will be made in the spring and summer of 1940 under the supervision of the Bureau of Standards, which will prepare a report on this work, submit it to the cooperating coating manufacturers for criticism, and present it at the annual meeting of the institute in 1940. A more complete and final report may be prepared later.

The following tests will be made as on former inspections: (1) soil resistivity measurements; (2) current on the working lines; (3) pattern tests for the location of pinholes; (4) coating resistance (electrical); (5) inspection of coatings, probably in accordance with the UPPI Code for inspections; (6) measurements of pit depths on bare and coated specimens of pipe. Photographs of each coating will probably be taken but only a few of them will be published.

At each of 13 test sites there remains 14 coatings on each of two 12-foot sections of working pipe line. At 15 test sites there are approximately 46 varieties of coatings applied to 2-foot sections of 3-inch pipe. There are also several sections of uncoated line and 3-inch pipe at each test site.

Exposure of this large number of protective coatings applied to working pipe lines exposed to a variety of soil conditions for 10 years offers an unusual opportunity for the collection of information about the serviceability of protective coatings. At a recent meeting of the Topical Committee on Pipe Line Technology of the American Petroleum Institute it was decided to permit any one who so desired to be present

at the time the coatings were exposed and to make such observations as he wished under three conditions: (1) Private observers should not delay the work or injure the coatings; (2) the data obtained should be used only for scientific purposes; (3) the results of private inspections should not be published prior to the publication of the final report by the American Petroleum Institute.

Two organizations have already indicated their intention to have representatives accompany the Bureau of Standards men from the beginning to the end of the inspection trip.

A tentative schedule for the inspections, subject to weather and labor conditions, has been announced by K. H. Logan, chief of the Underground Corrosion Section, National Bureau of Standards, Washington, as follows:

TENTATIVE SCHEDULE FOR INSPECTIONS OF PIPE COATINGS

Site Near—	Inspection Period
Long Beach, Calif.	March 4 to 12
Cholame Flats, Calif.	March 14 to 20
(Partial set of line coatings)	
Mendota, Calif.	March 22 to 25
(36 coatings on 3-inch pipe only)	
Temple, Texas	April 2 to 10
League City, Texas	April 12 to 20
El Vista, Texas	April 22 to 30
Spindle Top, Texas	May 1 to 9
Bunkie, La.	May 11 to 21
Council Hill, Okla.	May 24 to June 1
Skiatook, Okla.	June 3 to 11
Arkansas City, Kansas	June 13 to 21
Caney, Kansas	June 23 to July 2
Mt. Auburn, Ill.	July 5 to 13
Preble, Ind.	July 15 to 23
Chambersburg, Pa.	July 26 to Aug. 3

Streamlined prospecting act becomes fully effective

Streamlining of oil development on the public domain will become fully effective December 31 when the last of the outstanding prospecting permits will be called in, it was disclosed last week by Secretary of the Interior Harold L. Ickes.

Approximately 2250 permittees have been warned to file applications for the exchange of their permits for new five-year leases on or before the last day of the year. On the basis of last year's experience, when only 2500 applications for leases were filed by 4850 permits then terminated, only half of the remaining permittees will ask for continuation of their privileges.

If was explained at the department that that exchange of permits for leases is being made in conformity with the 1935 prospecting act, which discontinued the permit system in favor of prospecting leases, exempt from rental for the first two years and subject thereafter to a rental of 25 cents per acre per annum.

Pending the issuance of leases for which permittees file applications prior to December 31, drilling operations will be permitted to continue if a $5000 general lease bond is filed, it was stated.

Belgium restores lower import duty on gas oil

The increased Belgian import duty on gas oil of 70 francs per 100 gross kilos, which became effective November 15, has been suspended and the former rate of 10 francs per 100 gross kilos has been restored.

A refund of the amount of duty collected in excess of 10 francs per 100 kilos has been authorized.

United States helium reserves ample for emergency

Alone among the nations, the United States possesses reserves of helium which are more than ample for any emergency requirements that can be foreseen at this time. The supply of this rare gas available from the government-owned helium plant near Amarillo, Texas, which was designed and built and is operated by the Bureau of Mines, constitutes a practical world monopoly.

The present plant equipment at Amarillo has a capacity of 24,000,000 cubic feet of helium per year. and by installing another production unit in existing buildings the output could be raised to 36,000,000 cubic feet per year. As the present military and commercial demands of approximately 6,000,000 cubic feet per year are met by operating the plant at about one-quarter of the installed capacity, there is a large reserve capacity for emergencies.

In addition to the plant near Amarillo, the government owns two smaller helium plants at Dexter, Kansas, and Thatcher, Colorado, that are not being operated. These were built by private interests and purchased by the government under an act of Congress approved September 1, 1937, which directed the Secretary of the Interior, if possible under the terms of the act, to acquire all properties developed or constructed for helium production prior to its passage. That act also authorized the Bureau of Mines to sell helium for medical, scientific and commercial use.

To supply the Amarillo plant with helium-bearing natural gas, the Bureau of Mines purchased all gas rights in 50,000 acres covering the Cliffside structure, which is the best source of supply of gas for helium extraction ever discovered. On the basis of a conservative estimate, the Cliffside structure contains at least 100,000,000,000 cubic feet of recoverable natural gas of 1.8 percent helium content, which is equivalent to a reserve of 1,800,000,000 cubic feet of helium, or approximately 200 times the average annual production during the last 10 years. In the period from 1929 to1939, during which the Amarillo plant produced about 90,000,000 cubic feet of helium, the average rock pressure of the wells on the Cliffside structure declined only about 2 percent and is now more than 700 pounds per square inch.

The government's situation at Amarillo is almost ideal. It controls an entire geologic structure which it can operate as a unit in accordance with best engineering principles, and has a highly efficient plant that is independent of commercially-owned processes. The entire properties, including plant, gas acreage, wells, and pipe lines, are operated by Bureau of Mines employees, selected from Civil Service registers.

In addition to the resources of helium-bearing natural gas in the Cliffside structure, the government has two helium reserves in Utah which are being held for future needs. These comprise public lands that were withdrawn from entry after helium-bearing gas was found in wells drilled upon them.

When the United States entered the World War in 1917, helium was a chemical curiosity that had been produced only in laboratories. Since that time agencies of the Federal government have produced about 140,000,000 cubic feet of helium. Approximately one-third of that amount came from the helium plant near Fort Worth, Texas, which was operated from 1921 to 1929, and the remainder has been produced during the period from 1929 to 1939 in the plant near Amarillo.

Accident-prevention groups for 1940 announced by A.P.I.

Appointment of the 1940 Central Committee on Accident Prevention of the American Petroleum Institute by William R. Boyd, Jr., executive vice president, and of 14 other accident-prevention committees, has been announced by H. N. Blakeslee, director of the Institute's accident-prevention department and secretary of the central committee. J. Howard Myers, The Atlantic Refining Company, Philadelphia, is chairman of the new committee.

Myers appointed committees for the following activities: awards, first aid, accident recording and reporting, purchase of safe equipment, rotary drilling, natural gasoline, pipe lines, safe handling of petroleum products, safe motor-vehicle transportation in oil fields, tank-car safety accessories, cleaning petroleum storage tanks, organization for accident-prevention, safe driving of automobiles, and safe operation of service stations.

Members of the new central committee, besides Myers, are:

J. C. Bernd, Sinclair Refining Company, East Chicago, Indiana; R. W. Black, Standard Oil Company of New Jersey, Elizabeth, New Jersey; H. W. Boggess, Sinclair Prairie Oil Company, Tulsa; J. S. Boylan, Continental Oil Company, Ponca City; A. W. Breeland, Lone Star Gas Company, Dallas; J. H. Brown, Tide Water Associated Oil Company, New York; Glenn Byers, Shell Oil Company, St. Louis; S. W. Candee, Tide Water Associated Oil Company, New York; C. W. Coleman, Gulf Oil Corporation, Port Arthur; Lee B. Conner, The Texas Company, Houston; J. H. Cuthrell, Humble Oil & Refining Company, Houston; R. J. Daugherty, Cities Service Oil Company, Bartlesville; R. E. Donovan, Standard Oil Company of California, San Francisco; H. S. Elkins, National Petroleum Association, Washington.

O. H. Gundlach, Sinclair Refining Company, New York; R. G. Guthrie, Sun Oil Company, Philadelphia; John Hammermann, Jr., Gulf Oil Corporation, Houston; Frank Harrison, The Pure Oil Company, Chicago; W. V. Hartmann, Gulf Oil Corporation, Pittsburgh; R. T. Henderson, Standard Oil Company (Ohio), Cleveland; J. E. Heston, Petroleum Advisers, Inc., New York; D. B. Hiatt, Texas Pacific Coal & Oil Company, Ft. Worth; C. L. Hightower, United Gas Pipe Line Company, Houston; J. M. Ivy, Standard Oil Company of Louisiana, Shreveport; H. W. Jackson, Kendall Refining Company, Bradford, Pennsylvania; J. H. Kelley, The Atlantic Refining Company, Dallas; W. I. Kent, Magnolia Petroleum Company, Dallas; L. F. Knox, General Petroleum Corporation, Los Angeles.

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MEN IN THE INDUSTRY'S NEWS

W. ALTON JONES, first vice president of Cities Service Company, was elected president last week to succeed Henry L. Doherty, founder of the company, who died December 26.

Jones, who had been treasurer of the Empire District Electric Company at Joplin, Missouri, went to New York in 1921 as assistant to the late Frank Frueauff, chief executive of Cities Service under Doherty. He is 48 years old.

DR. E. F. DAVIS, formerly director of exploration in California for Shell Oil Company, Inc., has been appointed head of production and exploration for the company on the Pacific Coast. Succeeding the late J. U. Stair, Davis came to Shell from the faculty of the University of California in 1919. H. T. Wyatt, former production manager, will assist Davis.

H. E. CHRISTENSEN, district geologist for The Texas Company, Wichita, has been made district geologist in the Rocky Mountain area, with headquarters at Denver, where he succeeds E. H. Hunt. F. E. Mettner, Wichita, will assume Christensen's former work.

B. J. SKINNER, president of Mid-West Refining Company, Alma, has been re-elected president of the Michigan Oil Refiners Association. The association also re-elected all other 1939 officers as follows:

William Davis, Roosevelt Oil Company, vice president; Reid Brazell, Leonard Refineries, Inc., secretary-treasurer; and Herman Berg, Alma, executive secretary.

IKE E. HARWELL, 49, North Texas oil man and banker, died January 3 of a heart attack at his Burkburnett residence. He was an official of Burk Royalty Company, and also operated properties in the K-M-A deep area.

MONTY STANIFORTH, Wichita Falls producer, is receiving treatment at Baylor Hospital, Dallas, for injuries received December 27 while inspecting a drilling rig on his property in the Voth pool, North Texas.

R. S. (DICK) CATE, lease rental department clerk for Sun Oil Company, has been transferred from Dallas to Jackson, Mississippi, where he will be assigned to scouting duty.

W. B. SUTTON, assistant general counsel of Magnolia Petroleum Company, Dallas, withdrew from active service January 1 under the company retirement and annuity plan.

JOHN S. HASSON, SR., general superintendent of the Shreveport division of The Ohio Oil Company, retired January 1 after more than 46 years service with the company. He was succeeded by L. J. Lynch. Ralph A. Burdick on the same date retired as division cashier and office manager at Shreveport, being succeeded by W. F. Baldwin. Burdick has 37 years service with the company. R. A. Tilley resigned as assistant division superintendent on the same date to enter business for himself after 18 years service. The three retiring officials were honored at a banquet in Shreveport December 28.

W. ALTON JONES
Elected President of Cities Service Company.

W. L. WILGUS, of Shell Oil Company, gave a paper January 4 at the Houston Geological Society weekly meeting on "Geologic Problems of the Southwest Flank of Batson Dome."

T. B. HOFFER, for the past two years vice president and general manager of D. D. Oil Company, Mission, Texas, has resigned. He expects to remain in the Valley to look after personal interests and operate independently.

W. B. SHARP, president, and W. T. Campbell vice president, Mission Manufacturing Company, were hosts at a luncheon given to Tom Girdler, president, and N. J. Clarke, vice president, Republic Steel Company, at the Ramada Club in Houston, January 5.

HAROLD HELLER, South Texas district representative for Anderson-Prichard Oil Company, was in California last week for the Rose Bowl football game and the Tournament of Roses.

G. C. RHUMANN, oil man and banker of Kenedy, has returned from a hunting trip in Canada. He reports exceptionally good luck.

E. H. HUNT, Rocky Mountain division geologist for The Texas Company, was in Calgary, Alberta, Canada, last week.

R. W. WARD, vice president of Okalta Oils, Ltd., Alberta operating company, presided at a dinner given recently in Calgary for drilling crews in Turner Valley and other employees of the company. The event commemorated completion of the company's seventh well in Turner Valley.

H. D. PENNEL, geological scout for Amerada Petroleum Corporation in West Texas, has been transferred from Midland to Lake Charles for duty in Coastal Louisiana. He will be succeeded at Midland by Jack Conley, who has been stationed at Corpus Christi.

JOSEPH M. DAWSON, division geologist, Gulf Oil Corporation, at Corpus Christi, has resigned to operate for himself in Mississippi.

A.P.I. accident prevention group

[*Continued from page 37*]

Oscar B. Lewis, Ethyl Gasoline Corporation, New York; W. F. Lowe, Natural Gasoline Association of America, Tulsa; T. S. Maffitt, Jr., Houston Oil Company of Texas, Houston; J. L. Manes, Sun Oil Company, Dallas; H. T. Markee, Phillips Petroleum Company, Bartlesville; A. J. Martinson, California Petroleum Safety Board, Los Angeles; J. D. McCamey, The Carter Oil Company, Tulsa; M. C. McDowell, Rio Bravo Oil Company, Houston; A. M. McKean, Pan American Petroleum & Transport Company, New York; F. R. McLean, Socony-Vacuum Oil Company, Detroit; R. W. Metcalf, Signal Oil & Gas Company, Los Angeles; E. D. Murphey, Mid-Continent Petroleum Corporation, Tulsa; A. A. Nicholson, The Texas Company, New York; C. J. Nobmann, Shell Oil Company, San Francisco.

A. A. Odell, Barnsdall Oil Company, Tulsa; H. S. Pettingill, Richfield Oil Corporation, New York; Geo. F. Prussing, Union Oil Company, Los Angeles; W. P. Reymond, Jr., Standard Oil Company of Louisiana, Baton Rouge; J. L. Risinger, Socony-Vacuum Oil Company, New York; R. B. Roaper, Humble Oil & Refining Company, Houston; S. D. Saltonstall, Lion Oil Refining Company, El Dorado, Arkansas; C. W. Smith, Standard Oil Company (Indiana), Chicago; J. P. Sutton, The Ohio Oil Company, Findlay; C. L. Swim, Skelly Oil Company, Tulsa; C. R. Weidner, Sinclair Refining Company, Independence, Kansas; Frank Werner, Republic Production Company, Houston; H. J. Wilson, Tide Water Associated Oil Company, San Francisco; M. K. Youker, Phillips Petroleum Company, Bartlesville.

Larger refinery runs boost gasoline stocks

Sharply higher refinery runs, materially greater production of gasoline, and a large addition of gasoline to storage featured the latest statistics of the oil industry, which covered the week ended December 30.

Crude oil production was down precipitously, but the drop reflected only one of the extra shutdown days for Texas fields, under the current proration order.

Heavy withdrawals of heating oil from storage continued, and there was another substantial reduction of residual fuel oil stocks.

Production and Runs

United States crude oil production came down from 3,867,900 to 3,545,000 barrels for the week of December 30, and then was about 75,000 barrels under the indicated daily average market demand for December. The output was 10.6 percent greater than in the corresponding week last year.

Crude runs to stills rose from 3,395,000 to 3,445,000 barrels daily, a 50,000-barrel increase; and the new rate was 10.6 percent higher than that in the corresponding week last year.

Gasoline Situation

Production of gasoline totaled 11,686,000 barrels in the seven days ended December 30, against 11,494,000 in the preceding week, an increase of 27,000 barrels in the daily average output.

Gasoline stocks increased approximately 2,200,000 barrels within the week of December 30, in response to the increased production and an apparent lagging of demand. The stocks rose to 80,985,000 barrels, at which level they were 13.2 percent higher than at the corresponding time a year before. The demand for gasoline is running only about 5 percent higher than a year ago, as against the 13.2 percent increase in stocks. Furthermore, the stocks on hand a year ago themselves were excessive. It is indicated that the present gasoline inventory is between 10,000,000 and 15,000,000 barrels larger than necessary.

Fuel Oils

Stocks of heating oil came down further, as large seasonal consumption proceeded. The total amount of gas oil and distillate fuel on hand dropped from 35,068,000 barrels on December 23 to 34,184,000 barrels on December 30. The latter amount was about 5.2 percent smaller than the supply held at the corresponding time a year earlier. Yet demand for distillate fuel is running at least 10 percent higher now than a year ago.

Inventories of residual fuel oil continued to decline, as industrial activity of the nation remained exceptionally brisk. The national supply came down from 107,061,000 to 106,680,000 barrels in the week ended December 30. The stocks are about 11.6 percent smaller now than a year ago, whereas demand is running about 10 percent higher.

Stocks of crude oil in the United States jumped from 232,615,000 barrels on December 16 to 236,038,000 barrels on December 23, a relatively large increase of 3,423,000 barrels, according to the Bureau of Mines. For a considerable number of weeks, the crude stocks have held between 230,000,000 and 234,000,000 barrels, despite fluctuations up and down.

PRODUCT PRICES

	Range Late Last Week (Cents a gal.)		Changes from Week Before	
REFINED GASOLINE				
Oklahoma Refineries:				
62 Octane and Under	4	4⅝	...	...
63-66 Octane	4¼	4⅝	—⅛	—⅛
67-69 Octane	4⅛	5⅛	—⅛	...
70-72 Octane	4¾	5⅝	—⅛	...
Mid-Western Tank Car:				
62 Octane and Under	4	4⅝	...	...
63-66 Octane	4¼	4½	—⅛	...
67-69 Octane	4⅛	5⅛	—⅛	...
70-72 Octane	4¾	5⅝	—⅛	...
NATURAL GASOLINE				
Grade 26-70:				
F. O. B. Group 3	2½	...	—¼	...
F. O. B. Breckenridge, Texas	2¼	...	—¼	—¼
KEROSENE				
Oklahoma Refineries:				
41-43 water white	3⅝	4¼	...	...
42-44 water white	3¾	4⅝	...	...
Mid-Western Tank Car:				
41-43 water white	3⅝	4¼	...	...
42-44 water white	3¾	4⅝	...	...
FUEL OILS				
Mid-Western Tank Car:				
Range Oil	3½	3¾	...	—⅛
Gas and Fuel Oils:				
No. 1 Prime White	3½	3⅝	...	...
No. 1 Straw	3¼	3⅜	...	...
No. 2 Straw	3⅛	3¼	...	...
No. 3 Straw	3	3⅛	...	...
No. 5 (per bbl.)	65	70	...	...
No. 6 (per bbl.)	45	55	...	...

Gasoline prices off more but other products firm

Previous market trends were accentuated last week, when the strong Pennsylvania grade crude market showed additional strength through a crude price increase, and when the weak gasoline market became weaker, as evidenced by a further sagging of tank car prices in the refining centers of the Mid-Continent and in the Middle Western marketing territory.

There was also a strengthening of the crude market in Illinois and Indiana, as reflected in the posting of revised, higher prices by an independent refining company.

Pennsylvania Crude Raised

The 25-cent advance in postings for Pennsylvania grade crudes effective January 1 was the fourth increase within the past three months, the four raises together having aggregated 75 cents. The new revisions, like the earlier ones, reflected the strong demand for lu-

Trends of United States Production and Stocks

Figures are from American Petroleum Institute weekly reports, except those on crude stocks, which are from Bureau of Mines weekly reports

	Crude Oil Production (Barrels Daily)	Crude Runs to Stills (Barrels Daily)	Crude Oil Stocks (Barrels)	Gasoline Stocks (Barrels)	FUEL OIL STOCKS	
					Gas Oil & Dist. Fuels	Residual Fuel Oil
1937:						
August 28	[5]3,731,450	3,425,000	309,506,000	66,997,000	112,111,000	
September 25	3,666,300	[5]3,455,000	307,974,000	65,620,000	116,472,000	
1938:						
March 19	3,433,550	3,080,000	306,380,000	[1]93,192,000	122,067,000	
November 12	3,243,250	3,180,000	273,394,000	[6]67,551,000	34,175,000	120,491,000
November 26	3,260,900	3,295,000	270,563,000	68,628,000	33,749,000	119,885,000
December 10	3,245,100	3,150,000	[6]269,509,000	68,687,000	32,068,000	118,711,000
December 31	3,201,450	3,115,000	273,024,000	71,695,000	29,082,000	115,741,000
1939:						
January 28	3,248,250	3,235,000	271,763,000	77,279,000	26,583,000	112,766,000
February 25	3,328,850	3,185,000	271,758,000	84,597,000	23,419,000	110,252,000
March 25	3,382,350	3,225,000	273,915,000	87,561,000	21,487,000	107,551,000
April 22	3,526,700	3,280,000	277,156,000	[2]87,769,000	21,085,000	105,035,000
April 29	3,568,200	3,405,000	278,440,000	86,794,000	[7]25,844,000	[7]108,409,000
May 6	3,580,900	3,275,000	[2]278,607,000	86,216,000	26,167,000	108,597,000
May 27	3,585,250	3,405,000	278,289,000	84,152,000	26,992,000	109,386,000
June 24	3,452,800	3,430,000	272,297,000	81,733,000	30,239,000	111,726,000
July 29	3,539,100	3,460,000	268,513,000	77,887,000	34,900,000	114,053,000
August 5	[1]3,909,400	3,445,000	268,982,000	76,431,000	35,601,000	114,512,000
August 26	[10]1,690,800	3,475,000	246,982,000	73,475,000	37,722,000	116,237,000
September 30	3,658,200	3,560,000	233,023,000	71,168,000	38,081,000	115,466,000
October 7	3,435,850	3,505,000	231,564,000	[6]71,152,000	38,549,000	114,397,000
October 21	3,771,550	[1]3,650,000	[2]229,127,000	72,122,000	39,358,000	115,060,000
October 28	3,498,500	3,520,000	230,453,000	72,660,000	39,562,000	114,786,000
November 25	3,818,100	3,510,000	231,811,000	75,595,000	38,527,000	112,106,000
December 2	3,289,200	3,480,000	234,161,000	76,365,000	37,955,000	110,383,000
December 9	3,827,350	3,460,000	232,016,000	77,196,000	37,087,000	109,291,000
December 16	3,865,750	3,415,000	232,615,000	78,158,000	36,285,000	107,977,000
December 23	3,867,900	3,395,000	236,038,000	78,707,000	35,068,000	107,061,000
December 30, 1939	3,545,000	3,445,000	.....	80,985,000	34,184,000	106,680,000
December 31, 1938	3,204,350	3,115,000	[4]271,718,000	71,542,000	[8]	[9]
Change in past year	+10.6%	+10.6%	—13.0%	+13.2%	—5.2%	—11.6%

[1] All time peak. [2] Peak for 1939. [3] Lowest since April, 1922. [4] Stocks December 24, 1938.
[5] Peak prior to 1939. [6] Lowest for year.
[7] Prior to April 29, 1939, data did not include stocks at terminals, in transit, etc., except in California.
[8] Available data for year ago include only stocks at refineries and not at terminals, in transit, etc., except in California. Those stocks on December 30, 1938, totaled 28,144,000 barrels and comparable stocks on December 30, 1939, totaled 26,679,000 barrels, or 5.2% less.
[9] Available data for year ago include only stocks at refineries and not at terminals, in transit, etc., except in California. Those stocks on December 30, 1938, totaled 114,479,000 barrels, and comparable stocks on December 30, 1939, totaled 102,153,000 barrels, or 11.6% less.
[10] Lowest since October, 1922, due to the shutdown of six Mid-Continent states.

bricants, from domestic and foreign buyers.

The Pennsylvania grade oils now are $1.07 a barrel higher than they were a year ago. From the relatively low levels to which they sank in 1938, Pennsylvania grade crudes have come up as follows: 12 cents a barrel on January 21, 1939, 8 cents on February 2, 12 cents March 6, 25 cents October 6, 15 cents November 1, 10 cents December 1, and 25 cents January 1.

New prices, as of January 1, are as follows: Bradford district oil, $2.75 a barrel; Southwest Pennsylvania Pipe Line, $2.40; and oil in Eureka pipe lines, $2.34. Corning grade at the same time was left unchanged at $1.12 a barrel.

Ashland Oil & Refining Company, of Ashland, Kentucky, has increased its postings for crude in fields served by its lines in southern Indiana and Illinois, by adopting staggering prices. A flat price of 95 cents a barrel now is paid for the first 100 barrels per day from each well and 85 cents a barrel for all over that amount. Purchases will be on a per-well basis. The slight increase was made possible, it was stated, because of adoption of a combination pipe line and barge transportation policy. The company will take full production from all wells and leases to which it is connected.

The gasoline market further weakened during the past week, as unwieldy stocks became even more burdensome. Tank car quotations were lowered generally another ⅛ cent a gallon by both refiners and resellers. Prices now are back around the same levels as in early August. At that time, although quotations showed improvement over those in the spring, some refiners complained that product prices still were too low for profit, without lowering of crude prices. One major, accordingly, instituted a general crude price reduction, which in turn precipitated the general half-month shutdowns of oil fields in six Mid-Continent states. Having increased over 2,000,000 barrels in the final week of 1939, the gasoline stocks of the country now total approximately 81,000,000 barrels, and are over 13 percent larger than a year ago. In contrast, gasoline demand is up only about 5 percent.

Petroleum products other than gasoline meanwhile have continued strong, some additional gains having been made by prices of both light and heavy fuel oils, while kerosene prices have held steady.

Natural gasoline has sagged further, in sympathy with refinery gasoline. Within the past 10 days, another ¼ cent a gallon has been knocked off the Mid-Continent price of natural, which is down to 2½ cents, a price leaving producers no room for profit.

Indian lease sale

The Five Civilized Tribes will offer at public auction 5769 acres of oil and gas leases, beginning at 10 a.m. January 10, 1940. Counties represented in the sale include Washington, Nowata, Rogers, Tulsa, Creek, Okfuskee, Hughes, Seminole, Coal, Pontotoc, Garvin, McClain, Grady, Stephens, Jefferson, Carter and Marshall.

Texas allowable hearings set by commission

The Texas Railroad Commission has scheduled several more allowable hearings to be held during the next two weeks. On January 11, it will hear the application of Forest Development Corporation for a higher allowable for its C. E. Boyd 1, Stonewall County. At another hearing the same day, it will hear the application of Barnett Petroleum Corporation to exempt from shutdowns its J. G. Corbett 1 well, located in Section 2, Block 3, S. P. Railroad Survey, Stephens County, Texas.

A higher allowable for the Manvel field, Brazoria County, will be considered January 12. A hearing on the Dirks field, Bee County, also involving an allowable increase and originally set for December 21, has been reset for January 12.

An application to exempt the Midway field, Patricio County, from shutdowns will be considered January 15, while other hearings on the same day will cover application of James P. Nash for an increased allowable for wells in the Ray field, Bee County, and application for an increased or "reasonable" allowable for the new Anchor field, Brazoria County.

New Mexico Indian lease sale

The Jicarilla Indian Agency will offer at public auction, beginning at 10 a.m. February 1, three tracts totaling 5445 acres in Rio Arriba County, New Mexico. The acreage is on the Dulce dome, the Monero dome and the Garcia dome. Bids are being received at the agency office at Dulce, New Mexico.

United States Crude Oil Production

Estimates Compiled by THE OIL WEEKLY

DISTRICT OR STATE	Bureau of Mines Estimate of Daily Demand (January)	State Allowable in Jan.	BARRELS DAILY FOR WEEK ENDED Jan. 6	Dec. 30
TEXAS—				
Texas Panhandle	.....	.....	77,200	73,000
North Texas	.....	.....	79,250	79,500
West Central Texas	.....	.....	26,950	26,600
West Texas	.....	.....	228,250	226,000
East Central Texas	.....	.....	81,700	72,300
East Texas Field	.....	.....	396,250	419,000
South Texas	.....	.....	205,750	210,500
Texas Gulf Coast	.....	.....	224,100	218,500
Total Texas	1,411,000	1,376,000*	1,319,450	1,325,400
CALIFORNIA—				
Long Beach	.....	.....	43,000	43,200
Midway-Sunset	.....	.....	44,500	50,200
Kettleman Hills	.....	.....	51,200	52,900
Wilmington	.....	.....	83,600	84,600
Others	.....	.....	379,100	370,300
Total California	593,900	599,000†	601,400	601,200
OKLAHOMA—				
Oklahoma City	.....	.....	107,750	92,000
Seminole Area	.....	.....	110,025	108,170
Others	.....	.....	221,030	224,125
Total Oklahoma	433,900	433,900	438,805	425,495
ILLINOIS—				
Salem	.....	.....	184,250	183,250
Louden	.....	.....	76,100	75,050
Other New Pools	.....	.....	72,500	71,950
Old Pools	.....	.....	7,850	8,000
Total Illinois	314,800	.....	340,700	338,250

DISTRICT OR STATE	Bureau of Mines Estimate of Daily Demand (January)	State Allowable in Jan.	BARRELS DAILY FOR WEEK ENDED Jan. 6	Dec. 30
LOUISIANA—				
North Louisiana	.....	.....	68,800	69,750
South Louisiana	.....	.....	199,900	200,250
Total Louisiana	254,200	268,192	268,700	270,000
KANSAS	160,600	160,600	166,400	178,600
NEW MEXICO	101,900	101,900	110,000	109,850
EASTERN STATES—				
Pennsylvania Grade	.....	.....	78,500	80,100
Others, Eastern	.....	.....	26,000	26,200
Total Eastern States	100,700	.....	104,500	106,300
MOUNTAIN STATES—				
Wyoming	58,700	.....	62,800	64,600
Montana	15,400	.....	17,500	17,700
Colorado	3,900	.....	3,800	3,900
Total Mountain States	78,000	.....	84,100	86,200
MICHIGAN	61,000	65,000	67,500	68,750
ARKANSAS	59,700	71,200	70,950	71,300
MISSISSIPPI	.....	.....	2,000	2,200
NEBRASKA	.....	.....	50	25
‡Total 8 Prorated States	3,076,200	3,079,792	3,043,205	3,050,595
Total United States	3,569,500	.....	3,574,555	3,583,570

* Daily average, considering 13 shutdown days, and various exemptions.
† Recommendation of Central Committee of California Oil Producers.
‡ Texas, California, Oklahoma, Louisiana, Kansas, New Mexico, Michigan, Arkansas.

WORLD-WIDE DEVELOPMENTS

Edited by WM. V. GROSS, Associate Editor

Canada

Slackened demand brings cut in Turner Valley

Mid-Winter declines in West Canadian gasoline consumption brought the third cut in allowable production for the Turner Valley field of Alberta since November 13. The new schedule issued by the Alberta Petroleum & Natural Gas Conservation Board calls for production of 12,000 barrels daily to be distributed over 91 crude producers, compared to 14,000 barrels distributed over 90 wells during December. Forty-nine wells have allowables over 100 barrels.

For a large part of October and early November, Turner Valley wells were permitted to produce a total of 26,000 barrels daily. A reduction in the allowable to 20,000 barrels was ordered November 13, with a further cut to 14,000 barrels ordered December 2.

Mexico

Mexican minister says oil claims are "ridiculously high"

The Mexican government considers that the American oil companies have placed a "ridiculously high" valuation upon properties expropriated by Mexico in 1938, it was charged last week by Eduardo Suarez, Mexican Minister of Finance. In Washington to pay what he declared were merely courtesy visits to Secretary of State Hull and other administration officials.

The minister declared that Mexican appraisers had estimated the worth of the properties at from $10,000,000 to $15,000,000 and that his government would formally invite the companies to send their own appraisers to the Mexican courts to participate in a "fair and scientific" evaluation of the properties, which the companies have claimed to be worth between $300,000,000 and $400,000,000.

Explaining the low valuation which the Mexican appraisers had determined, Saurez asserted the properties included much obsolete equipment and pipe lines, and charged that the companies had failed to explore new oil lands or make new investments.

Russia

Sharp drop in Russian Black Sea oil exports

Petroleum exports of Russian Black sea ports passing Istanbul, Turkey, during September amounted to only 27,930 tons, as compared with 109,634 tons in September, 1938.

Fuel oil and gasoline accounted for the major portion of the exports, or 22,012 tons. Italy and Latvia took all of the fuel oil exports, while Siberia was marked as destination of 11,120 tons of the 11,618 tons of gasoline exported. The remainder of the gasoline went to Latvia. Estonia took 5918 tons of kerosene to make up the total.

Sharp drop in petroleum exports from U.S.S.R.

War in Europe in October was attended by a precipitous drop in petroleum product exports from Soviet Russia passing Istanbul, enroute the Mediterranean from the Black Sea. The sole cargo consisted of 14,491 tons of fuel oil destined for Italy. In October of 1938 Russian Black Sea oil exports totaled 109,037 tons.

There has also been a sharp decrease of petroleum product exports for the first 10 months of 1939 as compared with those of the first 10 months of 1938, the figures being 514,064 tons and 713,177 tons, respectively.

Russian Black Sea exports by products are shown in the accompanying table:

RUSSIAN PETROLEUM PRODUCT EXPORTS

(Figures in Tons)

Product—	First 10 Months 1938	1939
Lubricating Oil	99,012	41,392
Fuel Oil	323,562	287,204
Kerosene	35,982	35,992
Gasoline	252,796	142,059
Benzol	.....	7,417
Asphalt	1,825	.....
Totals	713,177	514,064

November and December petroleum exports from Russia in 1939 were expected to be considerably below those of the corresponding months in 1938.

Colombia

Government may compete with private enterprise

Strong possibility of the Colombian government's actively entering the oil business and acceleration of exploration and drilling in that country through increased competition are seen in pending legislation at Bogota.

A bill introduced in the first days of November in the Colombia's chamber of representatives, where it was passed in first reading, would amend Article 52 of the Petroleum Act of 1931 (Law 37) to permit the government to enter into contracts for the exploration and exploitation of public oil lands in the Department of Santander Norte without obtaining congressional approval of such contracts, according to Clarence C. Brooks, commercial attache at Bogota. A provision of the bill also would permit the government to create by decree petroleum reserves, up to 10,000 hectares each, anywhere in the republic.

The aim of the bill, according to its authors, is to facilitate the development of oil lands in the Department of Santander Norte by removing the special requirement, viz., the congressional approval of petroleum exploration and exploitation contracts for that political division of the republic, and to enable the government to freely establish oil reserves in any part of the country.

Crude production higher in Colombia in October

Although it was late in October before production from the Barco Concession in Colombia started running oil through South American Gulf Oil Company's line from the concession to tide water at Covenas, government production figures reflected an increase of 147,591 barrels in Colombia's October production over that of September. Production for the two months was: September, 1,894,941 barrels; October, 2,042,532 barrels.

The amount of crude refined, however, showed a slight drop, runs in October having totaled 281,143 barrels against 291,116 barrels in September. Gasoline production was down also, as was ethyl gasoline, kerosene, gas oil, lubricating oil and asphalts. Increases were noted in production of power kerosene, fuel oil, naphtha and absorption oil.

Statistics on the two months follow:

Colombian Production

	September 1939	October 1939
	(Figures in barrels)	
Crude produced	1,894,941	2,042,532
Crude refined	291,116	281,143
Gasoline	87,182	84,685
Ethyl gasoline	4,973	3,569
Kerosene	13,854	7,897
Power kerosene	1,352	5,083
Gas oil	11,089	7,046
Fuel oil	207,453	214,140
Lubricating oil	3,037	34
Naphtha	111	222
Absorption oil	702	1,025
Asphalts	6,066	2,499
Dry-cleaning fluid	....	470
Natural gasoline consumed in refinery blending	45,636	46,198

Pemex workers incensed over officials' action

Workers of the producing and marketing divisions of Pemex, Mexico's government-controlled oil company, are reported incensed over what they regard as insincerity on the part of certain officials who, the workers allege, have failed to abide by the terms of various agreements entered into in connection with discussion of a new labor contract.

A Mexico City newspaper states that the complaint voiced by the union representatives is that when time came for ratification of the signatures on the agreements before Special Labor Board No. 7 Pemex officials refused to acknowledge their signatures unless certain changes were made in the provisions of the labor pact.

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THE COMPOSITE CATALOG

Illinois

Devonian tests command Illinois interest

Centralia.—Exploration of the Devonian lime horizon occupied the attention of operators in nearly every area of the Illinois basin as the new year began.

In the Lake Centralia-Salem district, nine Devonian completions to date have had a combined initial production of 27,676 barrels, an average of 3075 barrels a well. Most recent of the field's completions in the lime are: The Texas Company's N. Young 22, NE SE NE 20-2n-2e, acidized in pay at 3409-51 with 1000 gallons, flowed 2656 barrels in 18 hours, rated at 3428 barrels; Magnolia Petroleum Company's D. A. Shanafelt 29, 270 feet from the south line and 270 feet from the west line, NW NW 21-2n-2e, flowed 3080 barrels in 24 hours after 1000-gallon acid treatment, total depth 3460 feet; the company's S. Shanafelt 30, 396 feet from the south line and 291 feet from the east line, SW SE 29-2n-2e, flowed 2368 barrels in 24 hours after 2000-gallon acid treatment; Kingwood Oil Company's Shanafelt 20-A, SE NE NE 20-2n-2e, flowed approximately 3600 barrels in 24 hours after 1000 gallons of acid; Kingwood Oil Company's Shanafelt 19-A, SE NW NE 20-2n-2e, estimated at 3000 barrels after acid; Ladd Oil Company's Young's Church 4, SW SW SW NW 21-2n-2e, flowed 1590 barrels in 24 hours after 500 gallons of acid, total depth 3446 feet.

With Ladd Oil Company's completion on the Church lease, the 1-acre tract is yielding oil from all five of the field's productive horizons. One well is producing from the Benoist, another from the Aux Vases, and a third from the McClosky and St. Louis limes.

Further Devonian activity in the Bartelso pool of Clinton County was assured when 21 feet of saturation was cored at Paul Moseback's Maddux 1-B, SW SW SW 4-1n-3w, ½-mile due east of the field's deep discovery well and second deep operation in the area. Casing was cemented to about the top of the pay at 2413 feet. Total depth is 2134 feet.

Devonian shows have also been reported in the first deep tests in both the Tonti Township and Patoka fields of Marion County. In the former area J. Hal Jones and C. E. Deaton's P. J. Majonnier 2, NE NE SW 28-4n-1e, a townsite test, had a show of oil after casing was twice perforated at 2890-93, 2899-2903 and 2947-50 feet. The test was shut down, waiting on an acid treatment. In the Tonti field, Arthur "Tex" Harvey, the pool's discoverer, was preparing to drill plug with cable tools for a test of pay at 3510-25 at J. L. Kagy (Salem State Bank) 6, SE 33-3n-2e.

On the east side of the basin, Pure Oil Company was scheduled to spud in late Thursday for a Devonian or possibly a St. Peter test at Stella Billington 3, C E½ SE NE 27-1n-7e, across the road from the discovery well of the Cisne field in Wayne County. The St. Peter in that area would be found at about 7400 feet.

Carter Oil Company was making its first attempt to produce from the McClosky (Fredonia) lime in the Dix field area of Jefferson County. Plug was being drilled at the company's Mona Milton 1, Section 33-1n-2e, just across the Jefferson County line in Marion County, and a north offset to the field's northernmost producer. After finding the Benoist sand, only productive horizon in the pool, dry, the company set casing for a test of streaky McClosky pay at 2149-82 feet. The lower part of the pay area showed a heavy water content and was to be plugged off.

Refusal of Centralia's commissioners to approve drilling applications until surety bonds complying with the city's oil ordinance have been filed, has checked Devonian development within the limits of the city, but eight tests are active immediately west of the city's limits. The oil ordinance, recently amended, requires operators to post a $10,000 bond protecting both the city and private property owners, for each well drilled. It allows two wells to each productive horizon in every block, and requires the posting of a $100 inspection fee for every well drilled. The amendment specifies that a 40-gallon fire extinguisher must be installed at each well site.

Interest in townsite development followed completion of a 715-barrel Devonian well by Louis Lilly et al just 20 feet west of the city limits, Lot 4, Block 1, Pullen Subdivision No. 3. There are now six other tests in a two-block area of the same subdivision, and two other nearby operations, the deepest of which is about 2500 feet. The discovery well found pay at 2903-33 feet.

A prospective pool opener in White County, J. W. Carter et al's Ozonia Johnson 1, NW NW NE 25-6s-8e, will not drill plug for 10 days or two weeks. Seven inch was set at 2510 feet for a test of Hardinsburg sand pay at 2510-28 feet.

A Wabash County wildcat, Delta Drilling Company's J. Utter 1, SE SE NE 17-1s-12w, set casing for a test of doubtful looking Cypress sand after a plug back from dry McClosky.

A Williamson County wildcat, Joe Blalack et al's Smothers 1, NE SE NE 9-9s-2e, temporarily abandoned several weeks ago, has plugged back to test 19 feet of saturation in an upper Pennsylvanian sand at 1367 feet. Former total depth was 2448 feet. St. Genevieve was topped at 2415 feet. Another wildcat in the same county, Nation Brothers' Coleman 1, NW SW SW 1-10s-1e, was testing a McClosky show at 1971-90 after two acid treatments, but prospects for successful completion seemed slim.

Indiana

Tar Springs may be added in Schuh Bend area

Evansville, Ind.—First commercial-looking saturation in Tar Springs for the Schuh Bend area of the Griffin field was cored from 2100 to 2139 feet in Longhorn Oil Corporation's Mary Heil 5, 836 feet south and 2147 feet east of NWc Lot D, 7-3s-13w, Wabash County, Ill.

North of this test 2 miles, Halstead Petroleum Company's Gray 1, on an 8-acre lease in NW SW 29-2s-13w, was completed in Cypress with initial of 240 barrels in 24 hours.

Overshadowing other Griffin field activity was the failure through the McClosky of Continental Oil Company's John C. Blood 1, 3 miles east of production in Gibson County, 330 feet from the north line and 330 feet from the west line, NW SW 13-3s-13w. Starting at an elevation of 388 feet, it topped Tar Springs at 2024; Glen Dean at 2135; Cypress at 2366, set casing to 2368 to test showing to 2392 feet, topped St. Genevieve at 2688; Fredonia at 2708, had first McClosky break with slight show at 2728, and was abandoned at 2850 feet. Moran Drilling Company is contractor.

Abandoned at 2800 feet is a year-old test in Smith Township, northwestern Posey County. Inez Montgomery 1, NE NE 9-4s-12w, was spudded by Kenillind Oil Company, shut down for many months at 700 feet, and completed by A. C. Thomas, Ray Ryan and R. L. Bauman.

North of this test and across the Gibson County line, Harry Fotiades' P. Fleener 1, wildcat in SE NW SE 21-3s-12w, Montgomery Township, southwest of Owensville, shut down with engine trouble. M. L. Bass Drilling Company is contractor.

Southeast of the town of Griffin, Posey County, location has been made for D. M. Hollandsworth and Joe Minton's Jennie Hill 1, NW SE NW 7-4s-13w. It is the closest location yet made to Griffin, namesake of the Griffin field.

In Warrick County, southeast of Millersburg, Weinert Oil, Inc., has made cable tool location for W. M. Bockman 1, NW 13-5s-9w. It is just east of the county's first and only producer, Brammer 1, completed in the McClosky last April by Fred McWilliams at 1960 feet.

In Luce Township, Spencer County, near Hatfield, C. L. Snell, Trustee's Higgins-Biggerstaff 1, SW SE 6-7s-7w, was attempting to shut off water following shot in Waltersburg sand, from 1040-61 feet. August Grewe is contractor.

In the Rockport gas field of Spencer County, Gulf Oil Corporation is drilling the field's fourteenth test, E. S. Hamilton 1, NW NW 29-7s-6w.

Oklahoma

Hughes County wildcat indicates small producer

Tulsa.—Thompson Brothers apparently have a small oil producer at Meadors 1, NEc 23-9n-9e, 2 miles northeast of Fuhrman pool, Hughes County. On initial swabbing test 16 barrels of oil was recovered in 8 hours. After being shut in for 6 hours, it began flowing 4 barrels hourly accompanied by 100,000 cubic feet of gas. Pay zone is Cromwell sand at 3238 feet. Several dry holes surround this producer.

Two miles northeast of Broyles pool, Payne County, Thomas E. Barry and others staked location for Slick Estate 1, NW SW SE 24-18n-4e, with work starting immediately. In Broyles pool, Mulberry Oil Company completed a Wilcox-sand producer at Broyles 9, NW NW NE NW 26-18n-4e, which flowed 155 barrels in 24 hours through tubing. Pay was topped at 3820 feet and drilled to 3833 feet. This is the second producer from this horizon, being originally opened in 1927 with a 65-barrel well and followed by a gasser at Mulberry 7.

Derrick was erected at Gardner Petroleum Corporation et al's Ahrberg 1, NE SW SE 2-18n-1e, northeast of Ramsey pool.

Southeast of Sasakwa pool, Hughes County, Stanley Rogers completed the second producer for the area at Stand 1, SE NE NW 23-6n-8e. Sand pay at 2642-76 feet was shot with 20 quarts and on a pumping test, made 17 barrels daily. South of this well, Magnolia Petroleum Company abandoned Warren 1, NE SW SE 35-6n-8e at 1264 feet. Hall-Jordan Oil Company will spud Barker 1, SEc NW 3-8n-9e, 4 miles east Buckner pool, Hughes County.

J. E. Drilling Company staked Albright 1, NE NW SW 16-1n-20w, southwest of Altus pool, Jackson County. Harper-Knappenberger's Thompson 1, C SE 5-1s-21w, 10 miles southwest of Altus pool, drilled to the contract depth of 3500 feet, but may drill to 4000 feet before abandoning.

Summit Drilling Company was starting work at Thompson 1, SE SW NW 8-10n-11e, west of Weleetka field, Okfuskee County.

Shell Oil Company's Epperson 1, NWc SW 9-12n-10e, near Morse, topped first Wilcox at 3664 feet, and was drilling in hard dolomite below 3775 feet. A failure is indicated.

Beebe pool, Pontotoc County, was moved a location southwest at Gulf Oil Corporation's Watson 1, SE NW NE 35-5n-4e, swabbed and flowed 60 barrels in 3 hours. Pay formation is Viola lime at 2360-2476 feet.

Paul McIntyre et al's Kelly 1, SE NW NE 17-14n-8e, outpost to Deep Fork pool, Creek County, was abandoned at 3335 feet. Bryan Petroleum Corporation was drilling at Ah-Sey 1, NE NW NE 34-14n-7e, 3 miles southwest of Arno pool, Creek County. Indo Oil Company set surface pipe at Slick Estate 1, NWc 1-16n-9e, south of Heyburn.

George Travis and others will drill Teter 1, NWc SW 24-17n-2e, 4 miles west of Sporn pool, Lincoln County.

A second dry hole was indicated for Coyle pool, Payne County. The Texas Company's Carr 2, C W½ NW SE 12-17n-1e, was coring in dry Wilcox sand below 4935 feet, being topped at 4907 feet.

Gulf Oil Corporation's McClure 2, C SE NE 28-2s-3w, Fox pool, Carter County, swabbed 250 barrels of 36.5-gravity crude in 14 hours without any water through a ⅞-inch choke and gas volume estimated around 300,000 cubic feet. Hunton lime at 5525-48 feet was acidized with 5000 gallons. It is still testing. Carter Oil Company opened initial Hunton lime pay in Milroy pool, Stephens County, at Harley Community 1, which was completed for 785 barrels daily at 4912 feet in the lime.

Sinclair Prairie Oil Company was coring below 9225 feet at German 1, SW NW NW 1-6n-13w, near Carnegie, Caddo County. This is the state's deepest drilling well.

Kansas

Pool north of Bornholdt opened with good flow

Wichita.—Central Petroleum Company and Springrose Drilling Company have opened a new pool 2½ miles north of Bornholdt pool, McPherson and Rice counties, at Swanson 1, C N½ NW NW 18-20-5w. Mississippi lime was topped at 3304 feet and when penetrated to 3342 feet, a temporary potential of 540 barrels was established but when deepened 4 feet, flow increased to 200 barrels in 1½ hours, the crude being 37 gravity. The well is shut in for additional tankage.

Shell Oil Company's Smith 1, SEc NW 9-21-11w, between Snider and Snider South pools, Stafford County, flowed from 30 to 40 barrels hourly and was testing as the flow decreased on later gauges. Arbuckle lime was topped at 3403 feet and drilled to 3416 feet.

Jock Garden and others' pool opener in Cowley County, Rahn 1, SWc NW 13-34-5e, east of Arkansas City pool, flowed 150 barrels when opened for 1 hour but flow was then restricted by a choke to 60 barrels hourly. Pay is Bartlesville sand at 2910-49 feet. A half mile extension to the north for this area was indicated as Tulsa Oil Corporation et al's Scott 1, SWc 12-34n-5e, found good saturation in the same pay horizon at 2920-25 feet. Plugs will be drilled after the pipe has been cemented.

Between Ellinwood and Ellinwood West pools, Barton County, Phillips Petroleum Company's Petz 1, CSL SE NE 7-20-11w, ⅝ mile from either pool, cored saturated Arbuckle lime at 3302-05 feet and were running pipe to test. Sinclair Prairie Oil Company's Oeser 3, SWc SE 17-16-11w, extended Lansing lime production a ½ mile westward in Prusa pool, Barton County, making 145 barrels in 2 hours from 3265 feet in lime. Schneider et al's Knop 1, CNL NE SE 6-20-11w, ½ mile north of Silica pool, Barton County, had Arbuckle lime at 3334 feet and coring ahead without any shows.

Bradley Brothers staked location for Mattson 1, C S½ SE SW 19-20-5w, a mile northwest of Bornholdt pool, McPherson County, and south of the new discovery 2½ miles north of the pool proper. A mile northwest of Garber pool, Prunty Production Company staked Jones 1, NWc SW 32-21-1w. Westgate - Greenland Oil Company's Chindberg 1, C N½ NE SE 18-18-1w, 5 miles south of Roxbury pool, acidized Mississippi lime at 2763-2858 feet, with 1000 gallons and were awaiting reaction. Equal amount of oil and water have been swabbed on previous tests, averaging 10 barrels per hour.

Stanolind Oil & Gas Company's Boxburger 3, CEL NE SW 14-14-14w, established a potential of 1992 barrels daily to extend Gurney pool, Russell County, ¼ mile northward. Pay is Kansas City lime at 3064 feet.

H. H. Royer et al's Kirch 1, NEc NW 28-18-4e, south of Lost Springs pool, Marion County, set surface pipe and was drilling. Union Oil & Royalty Company and others staked location for Lueker 1, NWC 10-18n-4e, 4 miles south of Lost Springs pool.

Saco Oil Company was moving in materials at Hohl 1, CEL SE NW 12-18-10w, ½ mile north of Bredfeldt West pool, Rice County. Cities Service Oil Company's McGinnis 1, NWc SW 10-9-27w, southeast of Hoxie, Sheridan County, was making hole below 4785 feet.

Kenneth Wilson staked location for Ellis State Bank 1, C NE SE 29-15-20w, 5 miles west of Penny-Wann pool, Ellis County.

Kentucky

Henderson County wildcat has water, abandoned

Owensboro, Ky.—Sun Oil Company's R. A. Trigg 1, 2 miles west of the company's production in the Corydon section of Henderson County, was abandoned at 2710 feet with water in the hole. Starting at an elevation of 460 feet, the wildcat topped the Chester at 1655 feet, Menard at 1738 feet, Waltersburg at 1832 feet, had water in the sand at 1845-85 feet, topped Vienna at 1903 feet, Tar Springs at 1907 feet, Glen Dean at 2029 feet, Hardinsburg at 2060 feet, Golconda at 2160 feet, Barlow lime at 2293 feet, Cypress at 2300 feet, Renault at 2497 feet, Ste. Genevieve at 2575 feet, and Fredonia at 2613 feet.

Tennessee

Fentress County wildcat acidizing after oil show

Memphis.—Travis Smith et al's L. Choate 1, 9 miles west of Jamestown on Little Crab Creek, Fentress County, was preparing to acidize last week after recovering an oil show in the Knox at 1860-69 feet. At an elevation of 935 feet, the wildcat had Chattanooga shale

at 239-59 feet, topped Pencil Cave at 1010 feet, and the Knox at 1815 feet. Travis Smith et al's Porter Woods 1, 1¼ miles west of Boatland, was shut down at 1241 feet after topping Pencil Cave at 1038 feet. Chattanooga shale was at 383-417 feet, with some gas at 412 feet. L. M. Gaines et al's P. P. Beaty, 7 miles west of Jamestown on Obey River, had Chattanooga shale at 138-68 feet and was drilling.

R. Gear et al had rotary on location for Lee 1, 3 miles south of Halls, Lauderdale County.

W. D. Compton & Son's Burford 1, 5 miles northeast of Celina, Clay County, abandoned at 650 feet after topping Pencil Cave at 454 feet. Elevation was 621 feet. A. F. Engel et al's Cordell Hull 1, 3 miles north of Celina, was unsuccessful in efforts to exhaust water with oil show at 760 feet. Operators were reaming to reset casing. J. H. Overstreet is contractor. Luke Lea, Jr. et al's G. H. Lynn 1, in Tinsley's bottom on the Jackson-Clay County line, was shut down after topping Pencil Cave at 336 feet.

Forest City Basin

Richardson County discovery acidized

Falls City, Neb. — Pawnee Royalty Company's Boice 1, C NE NE 18-1n-15e, Richardson County discovery, was acidized with 2000 gallons in the Hunton lime at 2279-88 feet. It started swabbing 20 barrels of fluid hourly, of which 90 percent was water; and late in the week was producing 100 barrels of oil and 300 barrels of water.

The discovery, brought in last November 1, had been pumping 60 barrels daily in short runs to qualify for the $15,000 state bonus for the first Nebraska oil well to produce a minimum of 50 barrels for 60 days. The test was halted December 8 by paraffin and casing trouble. Eight-inch was cemented at 2240 feet Christmas week. Operators were preparing to go back on state test.

Meyers 1, C NW NW 24-1n-15e, by the same operator, was drilling below 2100 feet, nearing the Hunton lime level.

Alta Mesa operators ask increase

Operators in the Alta Mesa field, Brooks County, requested an allowable of 2000 barrels daily for the field at a hearing before the Texas Railroad Commission last week. The request was sponsored by Coastal Refineries, Inc., with a plant at Port Isabel which needs the oil. The current allowable is 25 barrels per well daily, and there are 21 wells in the field.

Production is from 2500 feet, and about 420 acres have been proven. Engineers estimated total productive acreage at 800, and the reserve in place at 4,000,000 barrels. Sand averages about 30 feet in thickness.

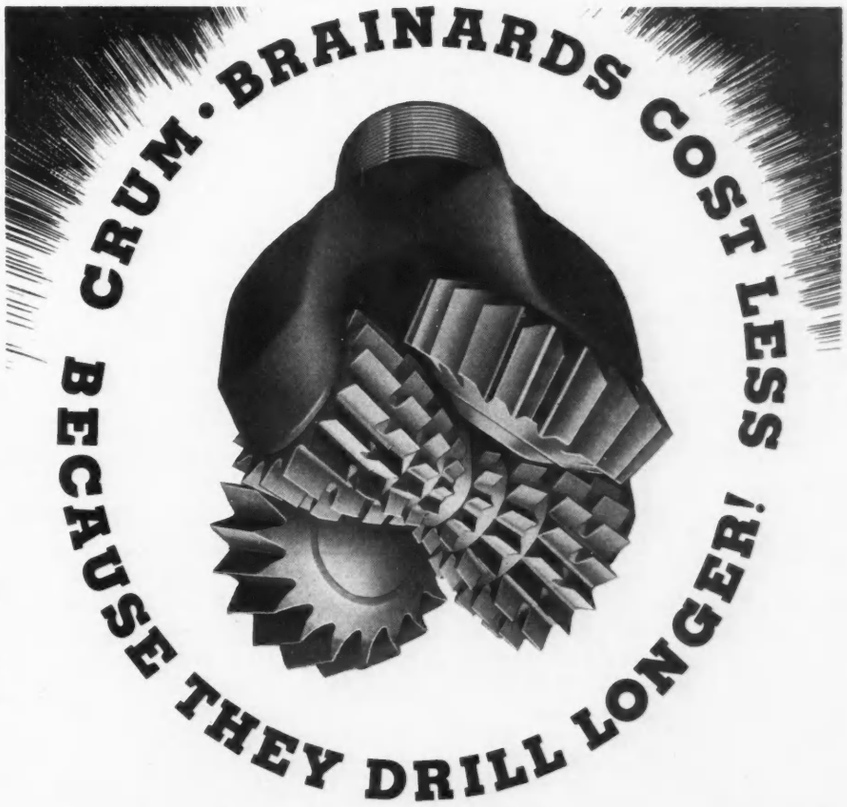
Refinery officials said that the plant has a capacity of 6000 barrels daily and needs the additional oil to supply gasoline on a contract which it has with an eastern concern. Valley Pipe Line Company would take the oil. Standard Oil Company of Texas is the principal operator in the field.

West Texas

Pecos County Ordovician test sprays oil with gas flow

Midland, Texas.—Gas production with light oil spray developed by Olson Oil Company and Bryce McCandless' Crockett 1, northern Pecos County Ordovician project, is the first strike for West Texas this year. Gas blowout occurred at 4462 feet after coring one foot of gas pay. Later cores yielded streaks of oil saturation to 4479 feet, where the well tested 5,000,000 feet of sweet gas and oil spray through 2½-inch tubing lowered to 4477 feet. Tubing packer was scheduled to be run late last week to exclude the upper gas and try for oil production in the broken pay at 4462-79 feet. Crockett 1 logged top of Ellenberger at 4405 feet, or 1944 feet subsea, being 223 feet higher on this marker than the nearest Ellenberger producer in the Apco pool.

The Apco 3-well area produces oil and very little gas from the top of the Ellenberger. Its only active test is Skelly Oil Company's Masterson 1, southwest outpost, reported drilling late last week at 1700 feet. Humble Oil & Refining Com-



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pany's Young 1, Ordovician wildcat and 8½ miles northwest of the Apco pool, was forced to cement 9⅝-inch protection string at 2763 feet because of artesian water flow.

Shallow development being carried on in the Todd ranch area, Crockett County, in order to perpetuate leases involved in deep prospecting contributed an outstanding producer. Stanolind Oil & Gas Company et al's Todd 4, GC&SF Section 30, Block WX, flowed 73 barrels of 21-gravity oil in 7½ hours from oil sand at 1215-19 feet. The gas volume was rated at 3,600,000 feet daily, but is from upper pay, topped at 1198 feet. Continental Oil Company et al's Todd 1, northwest offset, was testing for water shutoff preparatory for nitro shot or acid treatment after plugging back to 6620 feet. It yielded water when plugged back from 7010 feet to 6780 feet. Another test to the Ordovician has been started by the partnership on their 4480-acre unit block. It is J. S. Todd 2, C NE SW GC&SF Section 29, Block WX, being 4500 feet northwest of the above deep project.

Large Initial Flow

Large initial yield for the Upton County sector of the Gulf-McElroy field was developed by Gulf Oil Corporation's McElroy 207, which flowed 4258 barrels of 32.2-gravity oil via casing after 590-quart nitro shot at 2660-2865 feet. It produced 1039 barrels the first 5 hours.

Two natural producers given the Seminole field, Gaines County, require additional offsets that are likely to be started immediately. Magnolia Petroleum Company and The Atlantic Refining Company's H. & J. 3-219, flowed 940 barrels through casing in 12 hours after drilling to 5274 feet. The partnership has started operations on H. & J. 1-265, C NE NE Section 265, northwest extension area. Humble Oil & Refining Company and Texas Pacific Coal & Oil Company's Hahn 1, C SW SE Section 230, flowed 686 barrels through 3/16-inch choke from saturated lime at 5125-5270 feet. Hahn 2, an east offset, was drilling at 1200 feet. Humble Oil & Refining Company bears the cost of the first 2 completions as per contract made late in 1934 with Texas Pacific Coal & Oil Company when the latter sold half interest in 3100 acres in the Seminole area for a cash bonus of $50,000.

Seminole entered the new year with 25 flowing producers that are prorated to a base allowable of 50 barrels daily each. It is certain to receive considerable drilling during the next 12 months, and a pipeline outlet is likely to materialize in the near future.

Third completion for the Cedar Lake pool, northeastern Gaines County, required air-gas lift to attain a steady flow of oil. Stanolind Oil & Gas Company's Green 1, south offset to its discovery, earned an initial rating of 858 barrels of 32.8-gravity oil after 745-quart nitro shot at 4625-4768 feet. The company's Riley 1, situated 3½ miles northwest of production, failed to flow after 730-quart nitro shot at 4762-4864 feet, and is cleaning out with cable tool unit.

North Cowden Outpost Fails

Plugging orders were awaited for Richmond Drilling Company-Rhodes & Tompkins' T. P. Land Trust-Amerada 1, 1¾-mile southeast outpost for the North Cowden field, Ector County, after fulfilling contract depth of 4500 feet. Sulphur water was present with nominal oil and gas shows passed up in the regular lime horizon. Arrow Drilling Company's Midland Bank 1, SWc of 200-acre lease, W. L. Callihan Survey, east of production in the north end of the field, registered a low structural position in drilling to 4475 feet. Seven-inch pipe was cemented at 4373 feet. Cable tools will be used to deepen. Top of brown lime marker was called at 3920 feet, with an elevation of 3056 feet.

Treated with 3000 gallons of acid, Landreth Production Corporation and Shell Oil Company's Johnson 1-A, situated on a strike between the Foster-Johnson and Goldsmith fields, bailed 21 barrels oil in 18 hours. The hole is bottomed at 4310 feet, and will be deepened to sulphur water, or 4500 feet to fulfill contract.

Continental Oil Company's Johnson 1-B, SE SW NE T&P Section 5, Block 42, broadened the Foster field to the northeast in recording a potential rating of 1361 barrels after 530-quart nitro shot at 4300 feet. The performance of this outpost provided a surprise development as tests to the west and southwest missed the regular pay zone.

Ector County was assigned 10 of the 16 new tests authorized by Gulf Oil Corporation the past week for the district. Nine locations were ordered drilled on its Goldsmith leasehold, and an edge test for the Jordan field involves the drilling of University 1-N, NW NW SE Section 9, Block 35.

Petroleum Producers Company's Sterling-Magnolia 1, ½-mile southeast outpost for the Sharon field, Scurry County, was showing for a commercial producer after 820-quart nitro shot at 2420 feet. No estimates were available as to the volume of oil as shot cavings have not been removed.

Oil from Palo Pinto indicated in Shackelford County well

Abilene, Texas.—An oil strike from the Palo Pinto lime in northwestern Shackelford County is indicated by Jones-Stasney-Groover & Rose's Wendt-Simmons 1, NWc H&TC Section 13, Block 3, which logged oil saturation at 3275-80 feet. The best porosity prevailed in the last two feet. Seven-inch pipe will be landed near the 3270-foot level for a production test. This wildcat is two miles northeast of the Ivy pool, and on the accepted production trend that includes the Griffin, Avoca and Ivy lime areas.

An oil horizon below the regular water level in the Palo Pinto or Canyon section, is awaiting a production test by a southwest outpost for the Ivy pool. Having failed to make a well in the upper lime at 3195-3226 feet, Owens-Snebold Oil Corporation's Swenson 1, NE SE NW Section 163, found water at 3226-30 feet, then oil-saturated lime at 3255-76 feet, followed by hard lime to 3282 feet, total depth.

Shell Oil Company's Smith 1, Stonewall County wildcat, passed up a small volume of 36-gravity oil encountered in sand at 4395-4401 feet, and was drilling shale at 4430 feet.

T. G. Shaw, Trustee's Stroud 3, offsetting production in the Stroud pool, northeastern Stephens County, flowed 55 barrels of 38-gravity oil per hour natural on short gauge from Kisinger sand at 2586-91 feet. This pool was discovered last October, and is rated as one of the most important strikes for the district during 1939.

North Texas

Three separate oil horizons in Jack County Strawn test

Wichita Falls. — Three separate oil horizons in the Strawn series have been recorded by Shell Oil Company's Henderson 1, southwestern Jack County test on a geophysical prospect, in drilling to 3600 feet, where it is bottomed in hard dry lime and quartzite. This wildcat, situated in NW Section 2605, TE&L Company Survey, and 10 miles south by west of the Burns-Browning deep pool, signaled a year-end strike in yielding 2600 feet of oil in 15 minutes when formation tester was used on first pay at 3419-32 feet. More pay was encountered at 3519-29 feet, resulting in 720 feet of oil in hole with tester set at 3488 feet. The third horizon was cored at 3556-85 feet, and yielded 240 feet of oil and 400 feet of oil-cut drilling fluid in 30 minutes with packer landed at 3550 feet. The test was originally scheduled to go to 5000 feet, but operations may be halted to run pipe to complete in the Strawn.

A lower oil zone for the Burns-Browning pool appears promising as result of workover operations on Shell Oil Company's W. A. Davis 1, south offset to the 4461-foot discovery. Davis 1 missed the regular pay, and cemented 7-inch pipe at 4923 feet to test oil saturation at 4949-5008 feet with the hole bottomed at 5100 feet. This horizon failed to make a commercial well, and the hole was capped last June. Upon the resumption of operations the past week, the well was found to have a hole full of oil, then flowed by heads.

Walter Gant and Continental Oil Company's Brown 1, western Montague County wildcat, failed to make a producer after using 8000 gallons of acid in basal Pennsylvania and Simpson at 6904 feet. It was drilling at 7037 feet with the Ellenberger as its next objective. Seven-inch pipe was cemented at 6843 feet, excluding favorable oil saturation logged in the Bend series, topped at 6112 feet. Eastern Montague County recorded a new wildcat with the landing of surface pipe for The Texas Company's P. J. Martin 1, located 2734 feet from west and 990 feet from south lines of C. A. Barnes Survey, A-48. It is situated east of the Bonita 7-well pool.

Foster Petroleum Corporation's Allee 1, Foard County wildcat and 2¾ miles west of shallow production in the Crowell pool, logged top of Ellenberger at 3340 feet. No shows were reported in drilling to 3370 feet, except for show of gas passed up at 2296-2329 feet.

King Oil Company et al's W. T. Waggoner 1-U, SE SW H&TC Section 5, Block 17, Wilbarger County wildcat and on a northwest strike from the Consolidated pool, logged light show of oil in lime at 3808-24 feet, and was drilling at 4475 feet.

Adequate crude market and transportation facilities to support active drilling in the K-M-A and Hull-Silk deep

areas during the greater portion of 1940 became assured the past week. Relief is to be provided by Sinclair Refining Company through the construction of a new 8-inch carrier that will boost its outlet from the above two areas to 23,000 barrels daily. Without this enlarged market the resumption of pipe line proration by spring would be inevitable, as some of the crude buyers have ceased taking on new well connections because of lines being filled.

East Texas

Big field had 25,991 wells at beginning of 1940

Kilgore.—The plugging of depleted oil wells in the East Texas field has become a routine matter. The peak level for total wells was attained during the third week in August, 1939, when the field was credited with 26,061 wells. The volume has been declining fairly steady since the above period in the face of continuous drilling of inside locations, varying from 17 to 29 operations on each weekly field report.

The field had 25,991 wells at the close of the year, according to Texas Railroad Commission records.

An average of 6 depleted wells per week were plugged during the last 13 weeks in 1939. About 150 accounted for dormant wells are classed as prospects for plugging in the near future in order to salvage the pipe and to curtail property taxes.

Continuous operation asked for Duval County field

Continuous operation for water wells in the North Government Wells field, Duval County, was requested by Southwest Producing Company at a hearing before the Texas Railroad Commission last week. The exemption sought would apply to 12 wells on the company's R. Wendt lease.

E. H. Keator, company president, said it was necessary to operate the wells continuously to prevent further water encroachment and to protect other wells on the leases which are in better condition.

Representatives of Sun Oil Company and The Texas Company asked that any exemption or increased allowable granted to the applicant be applied to the field as a whole.

Texas permits drop to 40

Permits for drilling 40 new wells in Texas were approved by the Texas Railroad Commission last week, 222 less than were allowed the week before.

One permit was approved in East Central Texas, in Navarro County, but none was permitted in the East Texas field. Two locations were reported from the West Central Texas district, while operators in West Texas were allowed to drill 22 more wells.

The commission approved the drilling of 10 wells in Southwest Texas and two in the Gulf Coast area. Three permits were approved in North Texas, but no locations were reported from the Panhandle.

Southwest Texas

Lower Coast starts year with encouraging wildcat activity

Corpus Christi.—South Texas Gulf Coast commenced the new year with a continuance of wildcatting successes, these furthering the possibilities of increased production during 1940. Several tests were in line to open new pools, while several other extension and new-sand discoveries indicate offsetting campaigns.

Victoria County becomes a hot spot as both shallow and deep trends are paying off. Northwest of the Victoria field, W. S. Boyle's work on Meyer 1 is being continued. After first completion attempt at 4775-80 feet tested salt water and oil, a new one is being effected at 4776-79 feet. The water apparently was coming from above or below the producing zone. It is opening the first Frio sand production for this Catahoula field.

Above 2000 feet southeast of production and in the same sand which produced gas in the discovery well, Trinity Drillers' Moeller 1 is an 80-barrel-

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RESOURCES

Cash and Due from Banks	$29,726,466.69	
U. S. Government Securities	15,723,895.97	
Other Bonds and Warrants	5,119,616.76	$50,569,979.42
Loans and Discounts		17,322,335.56
Overdrafts		1,228.19
Income Receivable Accrued		125,539.70
Stock in Federal Reserve Bank		180,000.00
Bank Premises		3,067,500.00
Customers' Liability under Acceptances		10,999.50
TOTAL		$71,277,582.37

LIABILITIES

Deposits		$64,433,955.15
Acceptances Executed		10,999.50
Income Collected Not Earned		54,375.05
Reserve for Interest, Taxes, Etc.		9,269.40
Reserve for Preferred Dividends		12,000.00
Capital—Preferred	$ 800,000.00	
Capital—Common	2,700,000.00	
Surplus	2,500,000.00	
Undivided Profits	756,983.27	6,756,983.27
TOTAL		$71,277,582.37

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per-day well via flow valve. Perforations were made at 2551-55 feet. Offsets to this well and the Boyle operation, as well as trend developments are bringing about eight new tests for this shallow pool.

New Field

Nomenclature committee of the South Texas Geological Society has designated Barnsdall Oil Company's Keeran 1-A as the discovery of a new Frio sand field in this county. The area, known as North Keeran, is one mile northeast of the original Keeran field. The test drilled to 7508 feet, plugged back, set casing at 5611 feet and is a completion through perforations at 5550-52 feet, making 45 barrels of 31.4-gravity oil and four million gas.

Vanderbilt-West district of Jackson County now is the most active sector of the lower Gulf Coastal trend. This is being furthered by the discovery of a prolific 5700-foot sand, third for the field. As a result of the strike, a twin-well drilling program is imminent.

Lonnie Glasscock has commenced Drummond 1-A, in the southeast corner of the lease, while Magnolia Petroleum Company is awaiting permit for West 41-A, another twin well. The plan proposed for twin wells will be to alternate the present wells at the surface with twins, making the top spacing 466½ feet from each well. The bottoms of the holes will be alternated, one to 5100 or 5500 feet, and the other to 5700 feet. This would make the bottoms of the holes 933 feet apart in each sand.

The 5700-foot sand's value was further illustrated as George Greer's Ward 1, which extended the pay 16,000 feet southeast, flowed 283 barrels of oil in 8 hours through ¼-inch choke, through perforations at 5725-36 feet. On the northwest side of the field, Louis Crouch and Superior Oil Corporation were completing the third and fourth producers in this pay.

Wynn Crosby further defined the Francitas field with J. V. Brocker 1, which was abandoned at 7996 feet. The Texas Company's Weed 2, in the same field was near 8700 feet on a 9000-foot contract.

The 7100-foot sand in the LaGloria field received a set back with Magnolia Petroleum Company's Hornsby 1 testing salt water through perforations at 7120-25 feet and again at 7105-15 feet. It has been plugged back to 6100 feet. It is an offset to Sam Maun 1, discovery.

Being drilled as a closed operation, rumors concerning reported shows in Coronado Corporation's Welder 1 cannot be confirmed. The well, located about three miles south of Seadrift in Calhoun County, drilled to below 10,000 feet and is said to have plugged back, testing showings up the hole. The company is planning to commence Welder 2, 2½ miles northwest.

Hiawatha Oil & Gas Company's Smith 8-B, deepest test ever drilled in Saxet field and second deepest well ever drilled along the lower Gulf Coast, is drilling and coring below 10,200 feet. It had 10 sands between 8000 and 10,000 feet, which indicated possible production when electric log was run.

Colorado County test shows Wilcox production possibility

San Antonio.—Coring near 10,400 feet, Davis & Company's J. R. McLane 1-A, on the Garwood structure in Colorado County, appears to be a potential discovery of Wilcox sand production. The well, located in NE SE Section 41, topped the Wilcox zone around 9630 feet, set 7-inch at 9780 feet, and was carried ahead. Streaks of sand, sandy shale, shale and hard sand have been cored from that level to the present depth. They have carried shows ranging from gas odors up to 11 percent saturation without any water.

The general trend is expected to get very active before spring. Several tests are reported projected through the trend from Colorado to Victoria County, but exact details are still lacking. Atlantic Refining Company's Conwell 1, 1½ miles west of Thomaston in DeWitt County, is preparing to spud on an 8500-foot contract.

In Bee County, Hewitt & Dougherty and R. R. Ogden's Weiss 1, 8500-foot project, is to be staked in the northeastern portion of the Uranga Grant, southeast of Pettus. Anderson-Prichard Oil Corporation and Mills Bennett have signed up for another well to around 8200 feet in the West Tuleta field. Bunte and associates are to commence their Wilcox sand test to 9500 feet in the Skidmore area shortly, while Texas Gulf Producing Company is working on a deal to deepen Culpepper 1, just west of Beeville, to at least 8500 feet to test the Wilcox formation.

In Webb County, several more wells are in prospect. Sinclair Prairie Oil

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Company is receiving bids for an 8500-foot test on the Callaghan ranch, about 19 miles from the east and 6 miles from the north county line. Having had to plug back due to a stuck drill stem, Tide Water Associated Oil Company may drill a replacement hole for Bruni 7 in the Bruni field. The first well attempted to blow out at 8959 feet and stuck the pipe. It has been completed through perforations at 5655-65 feet in the Queen City sand as a distillate producer to open a new zone for the field.

Rincon, Star County, adds new productive sands

Mission.—Rincon, Starr County field, was adding new producing sands to convert it into a multiple-sand producer. Davis & Company, took over these properties several months ago and has drilled several well-cored outpost wells.

Slick 2-A, Section 485, was carried to 5798 feet, was plugged back and perforated at 3995-4030 feet. A drill-stem test of two days' duration was made with pipe set on packer. Through ⅜-inch choke, the well flowed 80 barrels of distillate per day under 1200 pounds working pressure. The holes were squeezed and new perforations were being made in sand 3833-62 feet.

Slick 6-B, Section 528, was perforated at 3855-74 feet and produced 77 barrels of 38-gravity crude on a 12-hour gauge. It was jetted through ½-inch choke on tubing, injection pressure being 600 pounds.

Sun Oil Company's E. Rodriguez 1, 5 miles northwest of the Sun pool and 8 miles southwest of the Kelsey field, was coring in sandy shale below 4242 feet. It is attempting to either merge the two areas or open a new producing area.

Efforts were being made to control Dayle L. Smith's Fernandez 5, wildcat gassed in Porcion 46, 21 miles west of McAllen in Hidalgo County. The well had been drilled to 4026 feet in 1930 and after considerable trouble was completed as a gasser from sand 4010-4026 feet. After being shut in for months, it blew out several days ago flowing 3500 barrels of hot salt water per day.

Green prospect well having trouble completing

Beeville.—Continued disappointments have delayed completion of a discovery well on the Green prospect in Karnes County. Clyde Eckols' Newberry 1, which made a dry gasser from perforations at 2942-47 feet, was reworked and new perforations made at 2947-52 feet. The well started cleaning, building up 600 pounds casing pressure, but went dead. Efforts were being made to revive it late in the week.

Talco allowable cut

The Texas Railroad Commission has reduced the allowable for the Talco field, Titus and Franklin counties, effective January 1. The December allowable was 41,435 barrels daily. The new allowable is 21,574 barrels daily on a 7-day basis, resulting in a net reduction of 2500 barrels per day for the field.

Texas Gulf Coast

Second well in Rosenberg area has distillate at lower level

Houston. — Finding production 500 feet deeper than the recent discovery at Rosenberg, Fort Bend County, Magnolia Petroleum Company's Huntington 1, H. Scott League, either marks an extension or opens a separate area. Situated more than 3 miles northeast H. C. Cockburn's (now Humble Oil & Refining Company) discovery well, Huntington 1 had casing perforated with 24 shots between 8246 and 8250 feet, for a flow of 3 barrels per hour of 62-gravity distillate with a large volume of gas, with 9/64-inch choke. Tubing and casing pressures were 1450 and 1500 pounds, respectively; shut in, these pressures were 3100 and 3300 pounds, but decreasing. Cockburn's Dzierzanowski 1, discovery well, was completed through drill pipe at 7743 feet where it blew out. Failing to find the sand at this level, Magnolia Petroleum Company had cuttings subjected to a special geochemical test which encouraged drilling deeper.

Fred Browning's Socha 1, 1600 feet west of the discovery, was bottomed late last week at 8011 feet, operators planning to go 50 feet deeper. Sand cored from 7713 to 7740 feet showed gas but no oil.

About 6000 feet northeast of the discovery well at Anchor, Brazoria County, Humble Oil & Refining Company's Mettler 1, J. De Valderas Survey, was flowing 25 barrels of fluid per hour through ¼-inch choke with a tubing pressure of 900 pounds and a casing pressure of 1300 pounds. Casing was perforated from 10,490 to 10,494 feet with 12 shots. Initial flow was 24 barrels of pipe line oil per hour and then it started making water. It increased from 4 percent water up to 80 percent and then the water percentage decreased down to about 5 percent. Operators are still letting the well flow and if it makes too much water it will be killed and reworked.

Approximately 2200 feet northwest of the discovery well at Anchor, Glenn H. McCarthy's Salmon 1, Geo. Robinson Survey, was making 3½ barrels of water-white distillate per hour through a 11/64-inch choke after perforating casing with 24 shots from 9808 to 9820 feet. Tubing pressure was 2000 pounds with casing sealed. The operator probably will kill the well and perforate lower into the sand. McCarthy has made location for Neidringhaus 1, 2 miles southwest of the discovery well, in J. Bradley Survey.

A half mile southwest of the discovery well at Chocolate Bayou, Brazoria County, Glenn H. McCarthy's Andrau 1, H. T. & B. Section 5, was drilling in shale at 10,330 feet at the close of the week, below the regular producing sand. His Houston Farms Development Company 2, Perry & Austin Survey, was down to 10,289 feet in shale and it also is below the established producing horizon.

On the northwest side at League City, Galveston County, Phillips Petroleum Company's Stewart Title Company 4 blew out last week at 11,270 feet, blowing wild, but it is not expected to do much damage as 7⅝-inch casing is set at 9500 feet. The gas is believed to be from the 10,961-foot sand found in Wimhurst 1. Wimhurst 1 at one time was the deepest producing well in Texas.

On January 2, 1940, Pan American Production Company consummated a deal with Mar-Tex Oil Company for the latter's 667-acre Maco Stewart lease at Dickinson, for in excess of $500,000 cash. The acreage has 13 producing wells, averaging about 72 barrels of oil per well daily. There was no oil payment in the deal. There are a few remaining locations, but the purchaser has made no plans for development.

Dickinson was extended 1250 feet south when The Pure Oil Company completed Dobbie 1, T. W. Johnson Survey, drilled to 8853 feet and plugged back to 8801 feet, there 5½-inch casing was perforated with 48 shots from 8741 to 8751 feet. In 5 hours, through 12/64-inch choke, it made 23 barrels of 57-gravity oil and 2,240,000 cubic feet of gas. Tubing pressure was 3190 pounds and casing pressure 1090 pounds.

Titantic Oil Company's Guiterman 1, 4000 feet northeast of production at South China, C. T. Gaylor Survey, Jefferson County, came in flowing 11 barrels of pipe line oil per hour through a 9/64-inch choke last week to open a new producing horizon for the area. The outpost logged sand from 7490 to 7520 feet, the thickest yet found in the area. Casing was set at bottom 8005 feet, and perforated at 7512 to 7520 feet with 48 shots. Tubing pressure was 700 pounds and casing pressure 1200 pounds. The company made location for 3 more tests in the district.

About 2000 feet southwest of production at Thompson, Fort Bend County, Humble Oil & Refining Company's Wolters A-3 made 255 barrels of 24.1-gravity oil daily last week from 5390 feet. The oil was flowing through ¼-inch choke, with tubing pressure 300 pounds and a casing pressure of 1000 pounds.

Gulf Oil Corporation's Roberts 1 on the Cypress prospect, A. Roberts Survey, Harris County, was drilling below 7309 feet after making a drill-stem test at 6920 to 6930 feet, showing 100 pounds pressure, 330 feet of salt water and 1 gallon of distillate in 5 minutes.

On the Willis prospect in Montgomery County, Sturm & Womach's Foster 2, A. Pevehouse Survey, was coring in sandy shale at 5790 feet last week after logging salt water sands at 3739 to 3749 feet and from 3844 to 3854 feet.

Continental Oil Company was moving in for a Wilcox test on the Spring prospect in Montgomery County. Bender Estate 1 is in the H. Decrow Survey and is projected to 9000 feet.

Texas cuts rehearing period

The Texas Railroad Commission has revised its statewide rules governing motions for rehearing, reducing from 20 to 15 days the time allowed for filing.

Louisiana Gulf Coast

New field looms in Iberia Parish

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Tide Water Associated Oil Company was preparing a production test of Delta Farms 1, in the Delta Farms area, Lafourche Parish. The wildcat was drilled to 11,844 feet and 7-inch casing was set at 11,835 feet. Casing will probably be perforated in 29 feet of sand at 11,775-804 feet. If this sand is not productive, hole will be plugged back and tested around 11,300 feet. Other shows were logged at 11,275 feet, 10,000 feet, 9900 feet and 8900 feet. Sands were found by an electrical log and confirmed by side wall samples. If Delta Farms 1 is productive at 11,804 feet, it will open the third deepest producing field in South Louisiana. The deepest is at DeLarge, Terrebonne Parish, producing from 13,266 feet, and the next is at Horseshoe Bayou, St. Mary Parish, producing from 11,850 feet.

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Houston, Texas
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ELMAX CONSTRUCTION CO., INC.

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Jones & O'Brien's Jennie Stevens B-2, NW SE 12-10n-3w, which is seeking production from lower levels after logging the Woodruff sand at 4396-4405 feet, drilled below 5570 feet after logging 12 feet of sand in the Tuscaloosa (Woodbine), believed to have carried water.

In Chickasaw County where Carter Oil Company and J. A. Burnham have been leasing recently, Homer P. Lee has taken approximately 12,500 acres in Township 13 south, Range 5 east, south of Okalona.

George Robert Mitchell has been adding to his holdings in Township 7 north, Range 5 east, Franklin County. In George County, John C. Robins has been leasing in Township 2 north, Ranges 6 and 7 west and in Greene County, J. S. Wheeless, Jr., is leasing in Township 3 north, Range 8 west.

In Grenada County, James Papidokus and associates have 8000 acres in Township 22 north, Ranges 2 and 3 east. W. W. Blocker has been leasing in Townships 13, 14, 15 and 16 north, Ranges 2, 3 and 4 west, Humphreys County. Transwestern Oil Company has secured some acreage in Township 9 north, Range 11 west, Jones County. D. L. Wellons is leasing in Township 17 north, Range 5 west, Sunflower County.

J. B. Moncrief of Fort Worth, Texas, has assembled a solid block of 30,000 acres centering around Section 9-15n-2w, Humphreys County, for a 5000-foot test to start by next April 1. Magnetometer and seismograph surveys and soil analysis surveys have been made. Moncrief has also taken some acreage in Townships 17 and 18 north, Range 6 west. Magnolia Petroleum Company has acquired approximately 8000 acres in Wayne County by assignment in Townships 8, 9 and 10 north, Ranges 6, 7, 8 and 9 west. Hughes Drilling Company of Abilene, Texas, has 25,000 acres which must be drilled by February 1.

Michigan

Wise field in Isabella again is extended

Mt. Pleasant, Mich.—Extensions developed at year end and in late December promise of maintaining drilling activity at present levels. A comparatively open winter with little snow so far and mild temperatures also can be expected to aid in keeping drilling going without any abrupt decline.

Thirty-nine permits were issued for the last week of the year, bringing the year total to 1455 compared to 996 in 1938. The 1939 final total may be stepped higher when scattered permits, applied for prior to December 31, but which were not issued until later.

J. V. Wicklund Development Company appeared to have provided the second important extension for the Wise field, Isabella County, this week with Leosh 1, SW SE SE 8-16n-3w, just short of a half mile northwest of the company's Haley 1, a half mile extension of the previous week. Leosh 1 checked Dundee at 3671 feet and bottomed at 3738 feet with 5-inch casing filling up 1500 feet in 4 hours. Attempt to acidize with 2000 gallons failed when the 5-inch casing seat went out. The company has 420 acres in the area of Leosh 2 and Haley 1 (making 45 barrels on the pump and due to be acidized), and has applied for eight permits for the area. Bulk of the 420-acre spread is farmout from Socony-Vacuum Oil Company. Cities Service Oil Company is starting two 20-acre (diagonal) offsets to Leosh 1 and McClanahan Oil Company has one offset.

McClanahan Oil Company's State 1, Section 29-19n-6w, Redding Township, Clare County, ¼ mile out and farthest north drilled well in the field, flowed 500 barrels in 11 hours from Monroe lime at 3889 feet after the third acid treatment.

D. E. Huge's Bonketos 1, Section 11-20n-7w, Osceola County, wildcat, logged Dundee lime at 3919 feet and had an oil show at 4021-29 feet but was shut down at 4068 feet when samples showed water.

While the bulk of actual drilling, both proven and wildcat, is in Southwestern Michigan, the area was comparatively lacking of important developments as the new year opened. N. A. Trexler continued to debate future action on Bagley 1, Section 27-2n-9w, Barry County, shut down for 12 days at 1942 feet. The wildcat logged Traverse at 1867 and had saturation at 1867-69 feet.

Daily Crude Oil Company's Hambelton 1, Section 19-8n-13w, Wright Township, Ottawa County, was dry in the Traverse at 2025 feet, but will be saved for gas, logged in shallower sand at 1193-96 feet. The gas, gauged at 3,400,000 feet was from Berea.

C. C. Goff's Sims 1, Section 24-7n-13w, Tallmadge Township, nearly three quarters of a mile north of the developed area in the Walker-Tallmadge field, already has accounted for about 15 new drilling starts, but the extension well itself probably will not rate more than 15 to 30 barrels. It continued to test.

California

South Rosecrans wildcat makes 1100 barrels on test

Los Angeles.—Barnsdall Oil Company and Wilshire Oil Company's Santa Fe 1, semi-wildcat in the South Rosecrans area, yielded 1100 barrels of oil and 1,500,000 cubic feet of gas on a preliminary test at 8792 feet last week. Operators were preparing to complete.

Universal Consolidated Oil Company's 81-24C, NE 24-20-15, in the Northeast Coalinga field, Fresno County, was swabbed in at the rate of 3000 barrels daily from 7911 feet. Robert S. Lytle's 22-7F was completed for 1900 barrels daily at 7068 feet.

The Texas Company announced SPL 1 as a wildcat test of the Eocene sand in Section 23-17-15, at Cantau Creek, Fresno County.

Western Gulf Oil Company's B-44, Section 22-29-27, in the Fruitvale field, Kern County, was abandoned at 4090 feet.

The Oxnard district of Ventura County is experiencing a leasing campaign, with upwards of 5000 acres signed up. Hawaiian-American Exploration Company and The Texas Company are credited with the largest blocks.

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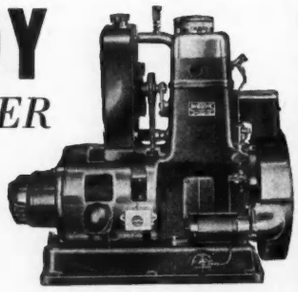

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WITTE ENGINE WORKS 1961 OAKLAND AVENUE KANSAS CITY, MISSOURI

UNITED STATES WELL COMPLETIONS

Company, Well and Location	Init. Prod. Bbls.	Depth
Arkansas		
Columbia County (Buckner)—		
Standard, S. T. Crone 4, 8-16-22...	500	7254
Columbia County (Dorcheat)—		
Atlantic, Pinewoods B-1, 16-18-22.	150	8890
Columbia County (Atlanta)—		
Mahoney et al, Emma Riley 1, 14-18-19	265	8240
Miller County (Rodessa)—		
W. C. Feazel, Heflin 1, 17-20-27..	50	6115
Union County (Rainbow City)—		
E. G. Bradham, H. C. McKinney 4-A, 30-17-15	25	2250
Oils Production, J. Moore 1, 1-17-14	*	3066
California		
Los Angeles County (Long Beach)—		
Atlantic, Atlantic 14	147	3338
Los Angeles County (West Montebello)—		
Albertson-Boswell, Schnackenberg 2	366	7706
Kern, Monterey 35	401	6736
Union, Paul Howard 1	572	6690
Los Angeles County (Seal Beach)—		
Continental, Bixby 25	2600	4775
Los Angeles County (Wilmington)—		
General, Blinn (LB) 6	64	3325
Long Beach Oil Dev., "Z" (LB) 1..	135	2882
Royalty Service, Santa Fe A-4	370	3601
Union Pacific, UP (LB) 122.....no est.		3989
Vulcan Oil Co., "W" 1	150	5724
Wilmington O & Dev. Co., "W" 3.	150	5720
Wilton Oil, No. 10	130	3696
Kern County (Coles Levee)—		
Union, KCL 56-11	420	9979
Fresno County (East Coalinga Eocene)—		
Robert S. Lytle, No. 22-7F	1896	7068
Universal Consolidated, Bfnkley 1.no est.		7911
Kern County (Greeley)—		
Standard, KCL 11-21	2035	11510
Kern County (Kern River)—		
Dick & Dore, No. 13	5	640
Fresno County (Kettleman No. Dome)—		
K.N.D.A., No. 41-28Q	1083	7900
Standard, No. 27-7Q	210	9856
Kern County (Midway-Sunset)—		
Signal O & G Co., Kendon 6	220	2387
Ventura County (Ventura Avenue)—		
British-American Oil Prod., Hartman 9	884	7940
Kern County (McKittrick)—		
F. E. Fairfield, Williams 2	*	1530
Kern County (Fruitvale)—		
Western Gulf, KCL B-44	6	4090
Fresno County (East Coalinga Eocene)—		
Standard, Nl. 62-13C	*	7472
Illinois		
Clark County—		
Midwest, Cole 1, sw ne sw 29-9n-14w	*	2585
Clay County—		
Pure, Scrughan 1, c s½ ne nw 24-4n-7e	900	3100
Clinton County—		
Lewis Lilly et al, Gum 1, ne sw ne ne 13-1n-1w	782	2933
Bell Oil Co. et al, Knolhoff 1, ne ne se sw 2-1n-2w	25	1329
Cascade, Adams 3, c ne se ne 13-3n-1w	75	1436
Effingham County—		
Kingwood, Reichhelm 1, sw nec 21-6n-6e	*	2955
Fayette County—		
Gulf, Whitehead 1, nw nw ne ne 1-5n-2e	137	1628
Weinsbhel, Black 1, se sw ne 25-6n-2e	88	1573
Texas, Griffith 6, 111 ft n of sw nw se 26-6n-2e	49	1607
Gulf, Small 14, ne sw ne 36-6n-2e	154	1620
Ohio, Swarm 6, nw se ne 36-6n-2e..	205	1610
Swarm 7, sw se ne 36-6n-2e	242	1611
Williams 2, ne nw se 36-6n-2e..	253	1612
Blalock & Walter, Logue 1, se sec 13-7n-2e	80	1564
Jarvis Bros., Yakey 14, se nw sw se 6-7n-3e	125	1570
Carter, Durbin 3, ne nw ne 8-7n-3e	116	1587
Max Pray, Seibert 1, nw nw nw nw 10-7n-3e	*	3262
Carter, Taylor-Reed 1, sw se sw 12-8n-3e	254	1518
Presbyterian Church 3, nw se ne 21-8n-3e	36	1630
Rhodes-Williams 1, sw se se 22-8n-3e	606	1515
Hogan 27-3, sec nw nw 27-8n-3e	100	1576
Mills 9, sw sw sw 28-8n-3e	720	1548
Birdie 4, se nw se 29-8n-3e	720	1542
Myers 4, ne sw se 29-8n-3e	990	1569
Magnolia, Watson 2, se se se 33-8n-3e	108	1587
Hamilton County—		
Carl Robinson, Porter 1, sw se sw 17-7s-7e	*	3660
Marion County—		
Hawley Oil Co., Bryant 1, Apx. c s½ ne ne 4-1n-1e	*	3344
Texas, Lankford 8, ne se nw ne 4-1n-2e	245	1879
Hollingsworth, Kalkbrenner 4, sw se ne sw 5-1n-2e	360	2245
Texas, Tate 16, sw ne sw nw 5-1n-2e	1169	1808
Johnson 24, sw ne se 6-1n-2e	665	1817
Gibson & Jennings, Phillips 3, se ne sw nw 7-1n-2e	360	1865
Texas, Friedrich 4, nec nw 7-1n-2e.	1582	1864
Magnolia, Shanafelt 30, c n½ ne nw 21-2n-2e	190	2094
Young 66, nw nw nw sw 21-2n-2e	2224	3452
Young 29, c n½ ne sw 21-2n-2e..	60	2098
Texas, Young 16, se ne sw nw 21-2n-2e	161	2064
Young 17, c n½ se nw 21-2n-2e..	140	2090
Hilton 4, sec ne 28-2n-2e	497	1838
Stroup 12, c e½ sw se 30-2n-2e..	504	1950
Friesner 14, 290 ft s of ne nw 32-2n-2e	189	1973
City of Centralia 40, se ne se sw 33-2n-2e	217	1855
Pure, Kohlmeyer 1, c e½ se ne 13-2n-7e	196	3125
Misner & Baldwin, Parker 1, sw sw nw nw 17-3n-1e	40	1445
Richland County—		
Pure, Wachtel 3, se sw sw nw 6-4n-10e	1377	2910
Bartlett 1, se sw ne se 29-5n-10e	*	3117
Heap 1, c e½ sw ne 30-5n-10e..	*	3456
Glossbrenner 2, 218 ft e of c s½ nw 31-5n-10e	797	2890
Wabash County—		
Skelly, Schrodt 3, se nw nw 29-2s-13w	210	2477
Washington County—		
Magnolia, Burczewski 4, nw ne ne se 15-3s-3w	28	1278
Taylor Drlg. Co. et al, Polk 1, nw sw sw 25-3s-3w	*	1350
Wayne County—		
Oil Well Drlg. Co., Hilliard 1, n½ ne nw 34-1s-7e	615	3315
Dunlap, Felix 4, nw sw ne 34-2s-8e	75	3413
Puckett, Oakley 2, sw nw ne 34-2s-8e	880	3402
Snyder, Vaughn 2, se ne nw 35-2s-8e	120	3414
White County—		
Baldwin, Daube 1, 15 ft n of c of ne nw se 31-3s-8e	235	3390
Helmerich & Payne and Eason, Hughes 1, ne ne nw 19-4s-14w..	*	3250
Exchange, Bramlett 1, se se sw 25-4s-10e	*	3145

*Failures; †Junked; ¶Million cu. ft. gas.

Summary of Drilling Operations in the United States, Week Ended January 6, 1940

	WELLS COMPLETED							NEW WELLS STARTED*				
	Completions	Oil Wells	Gas Wells	Failures	Initial Production	Total 1940	Total this Date 1939	This Week	Total this Month	Total 1940	Total this Date 1939	Year Total 1939
Alabama	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Arizona	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Arkansas	6	5	.....	1	990	11	8	2	3	3	8	223
California	24	21	.....	3	11,838	50	32	16	32	32	26	1,136
Colorado	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Florida	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Georgia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Illinois*	58	48	.....	10	19,901	128	66	.....	82	82	.....	893
Indiana	5	2	1	2	312	20	.....	.....	.....	.....	.....	.....
Kansas	36	24	1	11	33,561	66	44	7	47	47	42	1,449
Kentucky	10	6	.....	4	530	22	43	.....	.....	.....	.....	.....
Louisiana	40	33	3	4	7,598	71	25	.....	.....	.....	16	1,583
Michigan	32	17	1	14	5,914	63	37	39	69	69	35	1,419
Mississippi	1	1	.....	.....	300	5	.....	.....	.....	.....	.....	.....
Montana	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....
Nebraska	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Mexico*	23	17	1	5	7,198	37	25	13	24	24	.....	293
New York	21	21	.....	.....	120	43	6	.....	.....	.....	.....	.....
North Dakota	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ohio	28	10	12	6	30	37	21	.....	.....	.....	.....	.....
Oklahoma	42	27	1	14	9,035	84	74	7	42	42	53	2,059
Pennsylvania	41	41	.....	.....	38	73	46	.....	.....	.....	.....	.....
South Dakota	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tennessee	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Texas	164	121	4	39	69,119	352	345	40	302	302	64	10,269
Utah	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
West Virginia	9	2	6	1	5	18	16	.....	.....	.....	.....	.....
Wyoming	.....	.....	.....	.....	.....	.....	18	.....	.....	.....	.....	.....
Total this week	540	396	30	114	166,489	1,080	808	124	603	603	244	18,752
Total last week	540	405	22	113	193,711	540	389	479	479	479	161	18,752
Total this year	1,080	801	52	227	360,200	.....	.....	603	603	603	244	18,752

* This tabulation includes those states where weekly data are available; figures for Illinois date from October 15, 1939; New Mexico from August 1, 1939.
† Includes water-input wells.

United States Well Completions—*Continued*

Indiana

Company, Well and Location	Init. Prod. Bbls.	Depth
Dubois County—		
Howes & Son, Beckman 2, se sec 15-3s-3w	12	1155
Gibson County—		
Hulman et al, Hollis 1, 20 ft w of se se nw 36-2s-11w	*	2175
Halstead Pet. Corp., McCarty 1, 155 ft s of sw ne nw 13-2s-11w	*	1827
Posey County—		
Superior Oil Co., New Harmony Realty Corp. 18, se ne se 9-5s-14w	300	2210
Spencer County—		
Kelly et al, Cope & Axton 1, e½ nw se 30-7s-6w	¶5.532	892

Kansas

Company, Well and Location	Init. Prod. Bbls.	Depth
Barton County—		
Shell, Oeser 1, swc nw 17-16-11w	390	3325
Day et al, Feltes 1, sec ne 14-16-12w (OTD 3342 ft)	375	3336
Shell, Radenberg 2, sw nw nw 3-17-11w	702	3371
Stanolind, Panning 21, c s½ nw se 10-20-11w	2875	3291
Juttings 5, c w½ nw ne 6-20-11w	583	3308
Butler County—		
Reed et al, Millheisler 2 "A," c s½ nw ne 4-26-5e	135	2605
Shawver, Fee 1, sec nw 26-29-4e	*	3340
Cowley County—		
Mitchell Drilling Co., et al, Ireton 1, c e½ se ne 7-31-4e	*	3304
Brewer, Lewis 6, sw se ne 28-31-4e	3000	3367
McKnab, Southwestern College 2, se ne se 11-32-4e	*	3467
Tulsa Oil Corp. et al, Eddings 1, nw se se 16-32-5e	*	3131
Wakefield, Steele 1, c w½ sw se 6-32-6e	*	3114
Ellis County—		
Dickey, Stein 2, c s½ nw se 7-11-17w	3000	3419
Lario, Cress "C" 4, cwl sw se sw 13-11-17w	3000	3383
Shell, Rumsey 29, ne se ne 23-11-17w	3000	3423
Wakefield, Burnett "A" 2, sw ne se 1-11-18w	3000	3575
Gulf, Denman 1, c n½ se sw 11-12-18w	3000	3679
Greenwood County—		
Landon, Johnson 9, se sw nw ne 22-24-12e	25	1732
Marion County —		
Lariaux et al, Koreberg 2, sw se sw 21-17-4e	350	2408
Harwood, Novak 5, nw ne sw 28-17-4e	180	2480
McPherson County—		
Palmer, Williams 1, c e½ se ne 32-19-5w	*	3874
Continental, Meyers 2, nec nw 20-21-1w	437	3335
Pratt County—		
Skelly, Maxedon 5, cwl sw ne se 25-27-11w	406	3451
Rice County—		
McPherson Drilling Co. et al, Cramm "B" 1, swc 10-19-9w	756	3211
Central Petroleum Co., Roelfs 1, c n½ nw ne 27-19-10w	84	3286
Finston et al, Hathaway 2, c s½ ne sw 27-19-10w	810	3283
Stanolind, Menke 6, c n½ ne se 28-19-10w	¶5	3043
Tatlock, Proffitt "B" 1, nw sw sw 12-20-10w	*	3374
Carlock, Culbertson 2, c e½ se se 22-21-7w	*	3404
Russell County—		
Cities Service, Rogg "C," c s½ sw sw 21-14-13w	*	2915
Aylward, Solback 2, nw se ne 31-14-14w (OTD 3040 ft)	2552	3189
Skelly, Rein 5, c n½ nw se 8-15-13w	504	3244
Rein 6, c s½ ne se 8-15-13w	2054	3064
Coralena, Sellens 7, c e½ se sw 20-15-13w	2343	3321
Stafford County—		
Seaney et al, Brown 1, swc se 1-21-13w	*	3591
Trego County —		
Alma et al, Heckman 2, c sw se 11-11-23w (OTD 3510 ft)	*	4077

Kentucky

Company, Well and Location	Init. Prod. Bbls.	Depth
Butler County—		
Miller, Haws 8	10	453
Daviess County—		
Globe O. & G. Co., Clark 10	75	1238
Daugherty, Howard 5	150	1207
Daugherty et al, O'Flynn 7	70	1315
Ohio, Sands 1	*	1740
Snyder & Steward, Westerfield 3	200	1745
Henderson County—		
Sun Oil, Trigg 1-A	*	2710
Ohio County—		
Amos et al, Lewis 1	*	473
Vickers & White, Howard 2	25	594
Webster County—		
Chester Oil Co., Clark 1	*	3095

North Louisiana

Company, Well and Location	Init. Prod. Bbls.	Depth
Bossier Parish (Bellevue)—		
Gary & Gibson, Connell A-3, 15-19n-11w	10	377
Premier Inv. Co., Kendrick C-7, 22-19n-11w	10	875
Caddo Parish (Pine Island-Vivian)—		
Burnham Drlg. Co., Wilkinson 3, 33-22n-16w	75	2660
Lyons et al, Bostwick 1, 13-22n-16w	*	2714
Caddo Parish (Pine Island)—		
Arkansas Fuel Oil Co., Oppenhauser 7, 1-20n-16w	30	1340
T. B. Donnell, Surrey 1, 12-20n-16w	20	2276
Magnolia, Dillon 28, 24-21n-15w	5	1677
R.S.M. Oil Co., Rudderdorff 1, 11-20n-16w	65	1602
Texas Co., S. A. Guy 1, 1-20n-16w	105	1480
Guy & Richardson 1, 1-20n-16w	50	1491
W. & W. Oil Co., Arkansas Fuel Oil Co. 3, 12-20n-16w	75	1521
Sabine Parish (Wildcat)—		
M. Lanza, Phares 1, 5-5n-12w	*	2610
Union Parish (Monroe)—		
Memphis Nat. Gas Co., Taunton 1, 11-21n-3e	¶2	2204
We Hope Gas & Oil Co., Frost 8, 23-22n-3e	¶1½	2220
Woods Tr., Union Power Co. 2, 29-21n-3e	¶3	2212

South Louisiana

Company, Well and Location	Init. Prod. Bbls.	Depth
Bancroft—		
Republic, Columbia Land & Timber Co. 13	240	7330
N. Smith 2	120	7319
Baton Rouge—		
Wm. Helis, Duplantier C-1	200	6502
Lisbon-Iberia, College Town 2-A	312	6526
University Hills 2	310	6498
Charenton—		
Pan American, Laws 20	200	1166
Laws 21	44	1172
Robichaux 9	97	1169
Eola—		
Sid Richardson, Haas 9	688	8570
Golden Meadows—		
Golden Meadows Oil Co., Whitney Rebstock 1	50	2700
S. Rhoades Dr. Co., Falgout 2	270	5157
Texas Co., Falgout 4	455	7941
Falgout 6	166	5170
LLE Golden Meadows 7	238	7639
Garden Island—		
Texas Co., State 39	346	6222
Grand Lake—		
Superior, State 5	194	6718
Grand Bay—		
Gulf, Grand Prairie Levee District A-5	780	8750
Lafitte—		
Texas Co., L. L. E. Lafitte 14	706	10,089
Marrero 4	674	10,308
New Iberia—		
Texas Co., Schwing 3	210	7745
Sorrento—		
F. O. Roshko, Bernard 1	*	8004
Ville Platte—		
Continental, L. Haas 7	100	8991
A. Tate 3	250	9020
West Hackberry—		
Superior, Vincent 8	503	7100
Terrebonne Parish—		
Continental, Peters 1, Jug Lake area, 32-19s-15e	*	12,080

Michigan

Company, Well and Location	Init. Prod. Bbls.	Depth
Allegan County—		
Claude Sutherland, Ellinger 1, nw ne ne 19-3n-12w	*	1578
Jacob Bolema, Beltman 1, se se sw 27-4n-14w	75	1536
Lentz & Miller's Berens B2, nw sw se 27-4n-14w	95	1523
Socony Vacuum, Weist 2, se se nw 2-4n-13w	60	1679
Norgard 7, sw nw sw 2-4n-13w	45	1669
Gordon Oil Co., Weber 3, nw ne nw 10-4n-13w	65	1607
Muskegon Oil Corp, Schumaker 1, sw se nw 12-4n-13w	*	1619
Arenac County—		
J. S. Ress, Southworth 2, ne nw ne 15-20n-4e	¶9	1233
Hal-Be-Oyle, Kozma 1, sw sw nw 30-19n-4e	*	2870
Berrien County—		
H. Ostrander, Brooks 1, se ne nw 1-3s-17w	*	1008
Bay County—		
L. C. MacGregor, Club 1, nw nw nw 17-14n-5e	*	3150
Clare County—		
Pure, Bicknell B13, c n sw nw 28-19n-6w	2650	3879
Isabella County—		
Cities Service, Lennox 1, se se se 20-16n-3w	136	3714
Kalamazoo County—		
Smith Pet. Co., Taylor 1, nw se 33-2s-10w	*	1381
Kent County—		
Lenoran Pet. Co., Courtad 1, nw nw nw 7-8n-12w	*	550
Smith Pet. Co., Welgele 1, nw nw sw 23-5n-9w	*	2167
Red Man Oil Co., Consumers 1, ne ne sw 29-7n-12w	515	1884
C. J. Farley, O'Brien 1, se se se 29-7n-12w	110	1915
H. C. William, Thurkettle 4, ne ne sw 29-7n-12w	210	1863
E. B. Strom, Park 5, sw nw nw 30-7n-12w	175	1920
Certainteed, Fee 8, ne se 33-7n-12w	135	1930
Crown, Herpolshimer 1, nw nw 13-6n-12w	*	1892
Monroe County—		
Vanco Oil Co., Mueller 2, ne sw nw 30-6s-6e	2	2135
Montcalm County—		
H. L. Gentry, Christensen 2, se se 20-11n-8w	*	3380
Ottawa County—		
Freeman Oil Co., Lanning 1, se nw sw 30-5n-13w	*	1659
Lowry & Mapes, Venema 1, ne ne se 7-8n-14w	*	2087
Twin Drilling, McKay B1, se sw sw 24-7n-13w	900	1879
McKay 2, nw nw nw 25-7n-13w	700	1884
Daily Crude, Hambelton 1, nw nw nw 19-8n-13w	*	2025
Van Buren County—		
A. E. Kopprasch, Bockler 1, ne nw sw 5-1s-14w	*	1233
Thompson, Summy 2, sw ne ne 12-1s-15w	10	1175
L. C. Neely, Sanders 1, se sw ne 23-1s-15w	15	1180

Mississippi

Company, Well and Location	Init. Prod. Bbls.	Depth
Yazoo County (Tinsley Dome)—		
Union Producing Co., Stevens 2, 13-10n-3w	300	4561

New Mexico

Company, Well and Location	Init. Prod. Bbls.	Depth
Chaves County (Wildcat)—		
Comanche Drl. Co., Purcell-Sloop 3, c sw ne 15-11s-26e	*	1386
Eddy County—		
Berry et al, Berry 3, nwc se 23-17s-27e	*	595
Continental & S. P. Yates, Travis 2, swc se 3-18s-29e	456	2616
Franklin Pet. Co., Ballard 2-B, swc ne 1-18s-29e	700	2771
Grayburg Oil Co., Burch 13, nw ne sw 19-17s-30e	206	3162
Pittman et al, State 1, swc 16-16s-29e	324	1845
C. S. Powell-Matthews, Leonard-Levers 1, c ne sw 33-16-29	¶4.3	2265
Premier Pet. Corp., Beeson 3-F, sec sw 31-17s-30e	440	2850
Roael Oil Co., Saunders 4, nw sw se 13-17s-27e	*	544
Lea County (Eunice)—		
Ohio, State-McDonald 13, nec nw 13-22s-36e	1080	3760
Lea County (West Eunice)—		
Wilson Oil Co., State-Shell 2, c se sw 7-21s-35e	115	3866
Lea County (Lovington)—		
Stanolind, State 4-E, c ne nw 1-17s-36e	144	4960
State 5-E, c n½ se se 1-17s-36e	159	4977
Lea County (Mattix)—		
Gulf, Rilla 1, c se se 17-24s-37e	70	3625
Lea County (Penrose)—		
Gulf, Mattern 2-D, swc nw 7-22s-37e	420	3740
Lea County (Penrose)—		
Magnolia, Brunson-Argo 7, c se ne 9-22s-37e	170	3739
Penrose & Rowan, Crosby-Brown 1, c w½ ne nw 18-22s-37e	1680	3735
Crosby-Brown 2, c w½ nw ne 18-22s-37e	240	3728
Peters-Elder et al, Brunson 4, sw se sw 3-22s-37e	91	3740
State-Humble 2-H, swc se 34-22s-37e	840	3640

United States Well Completions—*Continued*

Company, Well and Location	Init. Prod. Bbls.	Depth
Lea County (Vacuum)—		
Magnolia, State-Bridges 49, c se ne 27-17s-34e	63	4604
Lea County (Wildcats)—		
Culbertson & Irwin, Lea-Texaco 1, c ne ne 8-19s-32e	*	3151
H. W. Leonard Oil Co., Ginsberg 2, c sw nw 7-25s-38e	*	3975

New York

Allegany County—		
Thornton, Agt., Brown, Alma	60	1365
Cousin Oil Co., Brandes, Wellsville	5	1374
Shallow Oil Co., Thomas, Scio	5	465
Charles Johnson, Rogers, Scio	5	453
A. M. Gray, Smith-Gray, Genesee	10	1390
Bradford Prod. Corp., Willetts, Genesee	2	1380
McMurdy & McCann, fee, Genesee	5	1366
Hill, Hughes & Keller, fee, Genesee	2	1345
Karl-Weller Oil Corp., M. M. Karl, Genesee	4	1354
Dermitt & Shaner, Swarthout, Bolivar	8	1387
J. P. Herrick, Howe, Bolivar	9	1374
Max Andrews, Burdick, Wirt	5	1349
Water (Intake) Wells—		
Patterson et al, Harris-Fuller-Beaver, Scio	...	790
Harris-Beaver, Scio	...	726
Harris-Beaver, Scio	...	735
Harris-Beaver, Scio	...	744
Harris-Beaver, Scio	...	757
Messer Oil Corp., Coon, Genesee	...	1342
Sloan & Zook, McDivitt, Bolivar	...	1312
McDivitt, Bolivar	...	1290
Cam Oil Co., Peavy, Genesee	...	1356

Ohio

Athens County—		
Gibson O. & G. Co., Van Dyke 7	5	480
Van Dyke 8	5	410
Townsend, Loeffler 2	¶.40	1630
D. T. Orndoff, Mulpas 1	¶.05	1377
Wooley 2	¶.05	1417
White 1	¶.05	1285
Belomnt County—		
Barnesville Dev. Co., King 1	*	1105
Fairfied County—		
City Nat. Gas Works, Martin 2	¶.20	2326
Guernsey County—		
F. Stranges, Spear 1	¶.65	1283
Larrick, Rich 1	¶.25	1320
Hartman, Beal 5	*	1262
Knox County—		
Ohio F. G. Co., Terenbaugh 1	*	3036
Licking County—		
Ohio F. G. Co., Oatman 2	¶.65	2712
Stricker, Porter 2	¶.08	652
Lorain County—		
W. M. Dempsey, Dunham 2	5	242
Medina County—		
Marine Trust Co., Shaw O1	I	351
Shaw 09	I	346
Packard 02	I	387
Ross 019	I	350
Ross 030	I	352
Eason & Son, Miller 1	*	2669
Meigs County—		
B. M. Tyree, Roush 2	¶2.00	2077
Monroe County—		
Stout & Shaffer, Starkey 4	*	2242
Noble County—		
Ohio F. G. Co., Wyscarver 2	¶3.00	1590
Betts, Gallager 1	¶.20	1096
Perry County—		
Wiser Oil Co., King Heirs 1	*	2781
Putnam County—		
Nicholas & Masters, Barbage 1	10	1375
Wyandot County—		
Perkins, Bland 1	5	1389

"I" indicates water input well.

Oklahoma

Carter County—		
Shell, Tubbe 39, sw sw ne nw 24-4s-3w (otd 1169 ft)	9	1218
Comanche County—		
Westheimer et al, Watson 3, sw ne ne 24-2n-10w (otd 1256 ft)	*	1875
Creel, Johnson 3, ne ne se sw 26-2n-11w	6	242
Johnson 4, sw se ne sw 26-2n-11w	6	249
Palmer, Linsburg 2, sw swc ne 26-2n-11w	*	404
Alma, Pettit 6, sw se se 11-4n-8w	*	3985
Gulf, Barrett 3, nec sw 10-1n-20w	23	1542
Creek County—		
Tidewater, Richards 6, se ne sw 4-17n-7e	*	2719
Hughes County—		
Senora, Warren 1, nwc se 35-6n-8e	*	3502
Canavan et al, Burke 1, c nw ne 8-8n-10e (otd 3200 ft)	*	4230
Kay County—		
Zephyr Drilling Co., High 1, nw ne nw 24-26n-2w	*	4145
Lincoln County—		
Wilcox, Furry 4, nwc ne 21-14n-6e	54	3091
Muskogee County—		
Arthur Oil Co. et al, Siebold 2, 200 ft w c s½ sw 1-14n-17e	*	2037
Mussellim, Rehfield 1, nw nw sw nw 33-14n-19e (otd 1515 ft)	*	1998
Wright, Siebold 1, sw sw se ne 26-15n-17e	¶.75	1175
Okmulgee County—		
Dow, Hutchings 1-A, ne ne nw sw 13-14n-14e	10	1086
Elm Oil Co., Hutchins 27, nw nw ne sw 13-14n-14e	10	1085
Steigner, Colbert 5-A, ne sec ne 14-14n-14e	5	1088
Pawnee County—		
Royalty, Poynter 1, ne nw ne 4-20n-6e	*	3540
Payne County—		
Mid-Continent, Wetzel 3, nw ne se 13-18n-1e	5577	4778
Mulberry Oil Co., Broyles 9, ne nw ne nw 26-18n-4e	155	3833
Texas, Carr 1, c½ nw se 12-17n-1e	1	4883
Pontotoc County—		
Sinclair Prairie, Moody "B" 4, sw ne nw 22-2n-7e (otd 3857 ft)	5	1370
Senora, Tucker 1, sw ne ne 35-5n-4e (otd 2453 ft)	62	2532
Stonewall, Haney 1, sec ne 16-5n-6e	*	3244
Sinclair Prairie, Nokoche 3, se ne sw 18-5n-8e (otd 2736 ft)	*	2566

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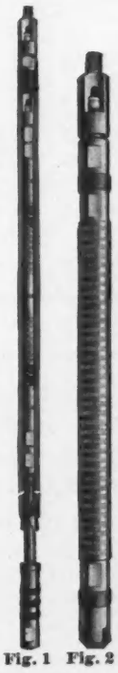

Fig. 1 Fig. 2 Fig. 3 Fig. 4

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United States Well Completions —*Continued*

Company, Well and Location	Init. Prod. Bbls.	Depth
Pottawatomie County—		
Iglehart, Phillips "B" 1, nw sw ne 4-6n-5e	25	4165
Alma, Johnson 3, se nw sw 19-6n-5e	303	2690
Marko, Vineyard 1, c sw nw 14-7n-3e	399	4370
Smith, Latimer 2, sw nw nw 21-7n-4e	45	3505
Gulf, Collins 4, se ne se 25-7n-4e (otd 4220 ft)	12	4249
Phillaine, Garrett 1, sec nw 28-7n-4e (otd 4175 ft)	227	4324
Sinclair Prairie, Deatherage 7, se nw nw 28-7n-4e	795	4347
Seminole County—		
Summers, Ceasar 1-A, swc 21-6n-6e (otd 3600 ft)	150	3685
Magnolia, Dixon-Ligon 1, sec sw 24-8n-7e	75	3344
Stephens County—		
Keister, Wilkenson 1, ne ne se ne 16-1s-5w (otd 603 ft)	10	550
Skelly, Glass 25, se sw se 33-1s-8w (otd 2222 ft)	20	2244
Carter Oil Co. et al, Harley 1, c ne ne 24-2s-4w (otd 8157 ft)	785	4912
Tulsa County—		
Crause et al, Kirk 1, nwc se 24-18n-14e	2	1352
Trinity Oil Co., Hard 1, c sw ne 26-18n-14e	•	1338
Wagoner County—		
Schmidt, Porter 3, nw se sw 23-17n-15e	165	1040
Barton, Fulatka 1, ne ne nw ne 26-18n-16e (otd 412 ft)	•	983

Pennsylvania

Company, Well and Location	Init. Prod. Bbls.	Depth
Bradford District (Water Intake Wells)—		
Forest Oil Corp., 2 wells	...	...
Forest Pet. Corp., 2 wells	...	...
Niagara Oil Corp., 7 wells	...	...
Bradford District (Regular Completions)—		
Ryder Scott Co., fee	5	...
J. B. Brown, Bell	1	...
Messer Oil Corp., Redfield	5	...
Forest Oil Corp., 3 wells	3	...
Forest Pet. Corp.	1	...
Niagara Oil Corp.	1	...
S. H. Elder & Co., Brown	1	...
Grant & Mohan 3, Bing 486-7	2	...
T. H. Gavin, Bing 317-31-22-27	1	...
M. Hungiville, McCullough	1	...
Bradford Transit Co., 9 wells	9	...
Cora M. Simon, Corwin	2	...
Middle District—		
D. R. Anderson, G. V. Stull	3	...
S. H. Elder & Co., Elder	1	...
Butler-Armstrong—		
Larkin, Rapp et al, Sasse hrs	1	...
M. B. Finnessy est., J. Snyder	¼	...

East Texas

Company, Well and Location	Init. Prod. Bbls.	Depth
Joiner Area—		
Hunt Oil Co., Bradford 29-D (176.3-ac)	240	3628
E. Skeen-Beren Oil Co., Cross 1 (5-ac)	2400	3709
Kilgore Area—		
Sinclair Prairie, King 64-A (366.7-ac)	†	3482
Longview Area—		
Bijo Oil Co., Bolton-Stanolind 1	•	3552
Washington Oil Corp., Cobb 11 (23.17-ac)	5600	3541
Anderson County (Cayuga)—		
Tide Water Associated - Seaboard, Wills 4-C	¶85	4084
Henderson County (Flag Lake)—		
S. Hunt & McMillan, Dillard-Magnolia 3	•	3149
Nacogdoches County (Wildcat)—		
Melrose Oil Co., Wilson 1	•	1153
Titus County (Talco)—		
Magnolia, Chapman 6 (341¾-ac)	165	4333
Van Zandt County (Wildcat)—		
Hickok-Reynolds & Lee, DuBose 1	•	4614

West Central Texas

Company, Well and Location	Init. Prod. Bbls.	Depth
Brown County—		
Bruce et al, Mauldin 1, sec 15	†	1691
L. H. Choate et al, Howell 1	•	1241
Hart & Son, Richmond 6-B	41	1312
Callahan County—		
R. C. Lanning et al, Battle 1	•	1742
Sprawls & Lenair, Anthony 1	•	405
L. A. Warren et al, Clinton 1	•	1757
Comanche County—		
Brock et al, Landreth 1	•	400
Eastland County—		
Fox et al, Weddington 1-B, sec 2054	•	4092
Jones County—		
Fain-McGaha Oil Corp., Lewis 8	400	1928
Humble, Graves 4	1655	2942
Lewis Prod. Co., Sayles 20	352	1970
Shackelford County—		
J. L. Hart et al, Sanders 3, sec 586	•	576
Martin & Sons, Davis 6	39	1717
Roeser-Pendleton-Conoco, Cook 3-A-113	40	1575
Sussex Oil Corp., Dawson-Conway 1-163	•	1323

West Texas

Company, Well and Location	Init. Prod. Bbls.	Depth
Ector County (Foster)—		
Continental, Johnson 1-B	1361	4300
Ector County (Goldsmith)—		
Gulf, Goldsmith 238	1288	4235
Goldsmith 239	1507	4224
Gaines County (Seminole)—		
Amerada, Auten 2	384	5258
Magnolia-Atlantic, H&J 3-219	1880	5274
Gaines County (Cedar Lake)—		
Stanolind, A.L. Green 1	858	4768
Gaines County (Wasson)—		
Continental, Moore 4-45	596	5053
Upton County (Gulf-McElroy)—		
Gulf, McElroy 207	4258	2865
Ward County—		
Mid-Continent, Sealy-Mag 4	3906	3046
Yoakum County (Wasson)—		
Aloco Oil Co., Wilder-Saltmount 3	1037	5123
Willard-Texaco 4-C	966	5194
Magnolia, Kendrick 11	854	5140

North Texas

Company, Well and Location	Init. Prod. Bbls.	Depth
Archer County (Hull-Silk)—		
Blackwell-Helmerich & Payne, Wilson 7	1376	4325
Christie et al, Little 2-B	1368	4356
Southern Pet. Exploration Co. (was Ligon), Wilson 3-C	1775	3863
Archer County (K-M-A)—		
Magnolia, F. Thom 2	660	3849
Archer County—		
King Oil Co., Robers 10, sec 1600	12	1280
Shappell Oil Co., Jackson 6-D, blk 5	19	677
Shell, Colgan 6	72	1453
Baylor County (Seymour)—		
British-American O.P. Co., Seals 2	700	2580
Clay County (Wildcat)—		
Frabor-Hodges Corp.-Sinclair Prairie, Scaling	•	5502
Clay County—		
Costley et al, Taylor 3-C, blk 41	272	1076
Taylor 2-D, blk 41	237	1073
Gerard et al, Glasgow 2, blk 35	•	260
Harvey et al, C. Groves 1, blk 87	•	1409
Cooke County—		
Bridwell Oil Co., Flusche 2-B	100	793
Parkey 13	13	725
Jack County—		
Hanlon & Buchanan, Garrison 2, sec 3	•	3508
Target Dri. Co., Kuykendall 1	378	3202

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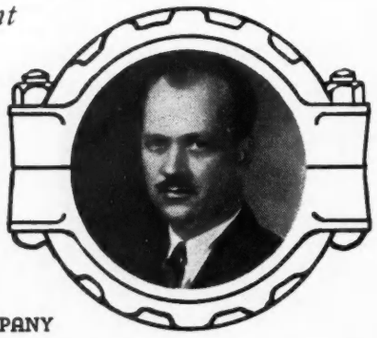

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By M. T. Halbouty, B.S., M.S., Merit Oil Corp.

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United States Well Completions—*Continued*

Company, Well and Location	Init. Prod. Bbls.	Depth
Wichita County (K-M-A)—		
Cochran & Cain, Preston 2, sec 27..	432	3962
Consolidated Oil Co., James 8, sec 16	1232	4002
E. C. Oil Co., Mangold 3-A, blk 35.	464	3866
Fain-McGaha, Griffin 13-B	1040	3833
Farrell & Co., Waggoner Bros 28-C, lot 17	800	3860
Granite Trust Co. No. 2, Martin 4..	664	3840
Hammon et al, Fee 6, sec 2	952	4048
Mitchell 4-C	1080	3891
Hammon-Hanlon & Buchanan, Hammon 7	1016	4062
Iowa Payne Oil Co., Thom 2	1248	3826
Peckham et al, M. A. Love 3	768	4095
Wichita County—		
Felty & Harwell, Hooks 1-A, blk 4	*	201
King Oil Co., Waggoner Est. 8-R..	41	1640
Proctor et al, Foster 43-A	32	934
Foster 44-A, sec 1	63	1702
Underwood Oil Co., Rogers 2	23	1206
Rogers 3	28	1207
Rogers 4	18	1211
Wichita County (Wildcats)—		
Corbett et al, F. C. Dodson 1	*	1002
Underwood Oil Co., W. P. Rogers 1	25	1206
Wilbarger County (Consolidated)—		
Consolidated Oil Co. et al, Ancell 1-K	1088	3780
Wilbarger County—		
Falls Ref. Co., Owens 6	126	3207
King Oil Co., Castleberry 7	1048	3230
Medders et al, Waggoner Est. 7, sec 45	179	1899
Young County—		
Gilmore et al, Watson 1, blk 22	36	559
Hunt et al, Goss 3, sec 1592	56	1233
Goss 4, sec 1592	27	1225

South Texas

SAN ANTONIO DISTRICT

Bexar County—		
Stacey & Moore, Walsh 1 (WC) Perez sur	*	418
Caldwell County—		
Bridges & Tinkle, Norcutt 1 (Salt Flats)	38	2732
Wilson, Northcutt 2 (Salt Flats)	85	2814
Gonzales County—		
Warnken et al, Dubosel-A (WC) Coffman sur	*	595
Guadalupe County—		
Gulf, Dix & McKean 17 (Darst Creek)	260	2612
Wilson County—		
Alterman & Collom, Voges 1 (WC) Menchaca gr	*	loc

CORPUS CHRISTI DISTRICT

Jackson County—		
Crosby, Brocker 1 (Francitas)	*	7996
Greer, Ward Est. 2-A (West)	750	5760
Humble, Toney 5 (Vanderbilt-West)	1000	5540
Jim Wells County—		
Hinds, Adams 1 (Alfred)	*	4878
Rio Bravo, T&NO 2 (East Alice)	*	loc
Live Oak County—		
Church, Wuthrich 1 (WC) 7½ mi w Three Rivers	*	1212
Nueces County—		
Agua Dulce, Talbert 7 (Agua Dulce)	100	5099
Corpus Christi, Wardner 10 (Stratton)	200	6454
Magnolia, Johnson 1 (South Clara Driscoll)	*	3469
Reed & Cox, Parr 2 (Minnie Bock)	325	3824
Refugio County—		
Morgan & Andrade, Rooke 2-C (La Rosa)	500	5876
Quintana, Williams 19-A (Tomoconnor)	1800	5925
San Patricio County—		
Graham, Coates 1 (East Mathis)	*	5830
Plymouth, Copeland 1-B (East White Point)	550	5668
Southern Minerals, McCampbell 2 (McCampbell)	325	7132
Miller 3 (McCampbell)	275	7158
Stanolind, Ferree 1 (East White Point)	¶2	5714
Victoria County—		
Gulf, Keeran Ranch 17 (Keeran)	550	6088
Traylor B-28 (Heyser)	750	5479
Transwestern, McFaddin 1-G (WC) 2 mi nw McFaddin field	*	6710

LAREDO DISTRICT

Duval County—		
Mills Bennett & Stanolind, Yates 2-A (WC) 4½ mi nw Fitzsimmons field	*	4220
Government Wells, Lundell 41 (Lundell)	133	1555
Hiawatha, Southland 4-A (Southland)	*	6015
Magnolia, Duval Ranch 1 (190) (Cedro Hill)	384	1433
Duval Ranch 17 (189) (Cedro Hill)	95	1436
A. Well 4 (113) (Hoffman)	46	2823
Navarro, J. Mew 6 (Fitzsimmons)	125	4252
Jim Hogg County—		
Colorado, Trevino B-1 (Colorado)	425	3064
Humble, King Ranch 2 (Colorado)	350	3032
Morgan, Martinez 1 (Colorado)	250	3056
Schimmel, Martinez 1 (Henne-Winch & Fariss)	*	2320
Starr County—		
Herbert Aid, Ramirez 1 (WC) share 13-C Por 71	*	750
Webb County—		
Arkansas Fuel, Adami A-3 (Adami)	41	1001
Magnolia, Volpe-Benavides 16 (Volpe)	45	2560
McClintock, Adami 2 (Adami)	67	988
Noble & Cash, Row & Bonham 1 (WC) 6 mi nw Carolina-Texas	*	2518
Zapata County—		
Interstate Minerals, Lopez 10-C (Mirando Valley)	125	1776

Texas Panhandle

Carson County—		
Texas Co., T. J. Boney-Magnolia 15	677	3080
Gray County—		
Humble, Haggard 7	391	3247
King Oil Co., Geo. Simpson 5	533	3277
Shell, Hughey 6	362	3172
Finley-Hoffman 9	292	2960
Stanolind-Magnolia, J. M. Saunders 6	223	3102
Hutchinson County—		
McIlroy Oil Co. et al, Haile 11	751	3040
Stanolind, Haile 17-B	54	3070
Haile 18-B	53	3043
Ware 15-B	249	3124
Texas Co., R. L. Pond 15	663	3090
Sherman County—		
Hagy-Harrington & Marsh, Freeman 1	¶14.9	3272
Wheeler County—		
Alma Oil Co., Perkins-Cullum 2	268	2405

Texas Gulf Coast

Anahuac—		
Humble, Gripon 21	75	7100
Batson—		
B. G. Dowell, Hilhome 19	10	1053
Danbury—		
Rowan Dr. Co., Jamison 11	*	7689
Fairbanks—		
Kirby Pet. Co., Hillbrenner 1	125	6832
Williams et al, Fairbanks Heights 1	137	6844
Friendswood—		
Humble, Kiesling & Dixon 16	504	6041
West Prod. Co. 40	524	6042
High Island—		
Stanolind, Smith B-19	¶1½	5962
Joe's Lake—		
Republic, Fee 28	439	7709
Lovall Lake—		
Humble, Broussard Trust 13	165	7811
Magnet—		
Pan American, Britton 3	383	5551
Manvel—		
Texas Co., Ewing 9	200	5372
Old Ocean—		
Harrison & Abercrombie, Armstrong 7	444	10070
Segno—		
Gulf, Wing 24	83	8136
Humble, Kirby Lbr. Co. B-X-19	413	8168
South China—		
Titantic Oil Co., Guiterman 1	264	7520
Thompson—		
Gulf, Wolters B-2	121	5410
Humble, Davis 18	489	5410
Wolters A-3	255	5390
Tomball—		
Texas Co., Doughtie 5	74	5555
West Columbia—		
Texas Co., Abrams 34	395	5442
Hogg 91	394	3008
Withers—		
McDannald Oil Co., Norris 1	102	5567
Texas Co., Thompson A-15	118	5541
Pierce Estate C-67	*	5580
Ft. Bend County—		
Gulf, R. Brown 1, Wm. Pettus sur	*	8550
Harris County—		
Mayo & Thompson, Sharp 1, G. Haynie sur	*	6518
Jefferson County—		
Falcon-Seaboard, Powell 1, W. V. Vacoco sur	*	9264
Washington County—		
Sunray, Lockhart 1, G. Kuykendall sur	*	7000

West Virginia

Boone County—		
Hope Nat. Gas Co., Hopkins 7911	¶4.14	2405
Clay County—		
Thompson Gas Co., Matthew et al T-38	¶.04	2106
Gilmer County—		
F. G. Bisk, Messenger 2	¶.05	1942
Jackson County—		
United Carbon Co., Riley et al 1	¶18.00	5106
Lincoln County—		
United F. G. Co., Huntington Gas Co. 2371	¶.30	3050
Pleasants County—		
E. M. Henning, Mercer 1	3	1830
Roane County—		
Bonnett O. & G. Co., Jones 1	¶.50	1668
Reedy O. & G. Co., Llewellyn 1	*	1630
Tyler County—		
Tyler Wood Oil Co., Davis 1	2	1750

*Failures; †Junked; ¶Million cu. ft. gas.

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WILDCAT REPORT
New Starts and Completions

CALIFORNIA
FIRST REPORTS

Fresno County—Texas Co., S P 1, nec 23-17-25, Cantau Creek area, lcn.

Kern County—Amerada, Core Hole H, sec 13-25-27, Jasmine area, lcn.

Los Angeles County—Canyon Oil Co., Sanborn 1, sec 6-3-16, Newhall area, rig.

KANSAS
COMPLETIONS

Barber County—Patton Drilling Co.'s Hoss 1, c w½ nw sw 12-30-15w, 9 mi ne Lake City pool, top Topeka 3091 ft, top Lansing 3905 ft, top Mississippi 4410 ft, top Simpson 4520 ft, top Arbuckle 4614 ft, abnd 4760 ft.

Lyon County—Royer et al's Trear 1, sec nw 20-21-12e, 2½ mi n Frankhauser pool, top Kansas City 1345 ft, top Mississippi 1996 ft, abnd 1997-2006 ft.

NORTH LOUISIANA
COMPLETION

Sabine Parish—M. Lanza, Phares 1, sec ne se 5-5n-12w, elev 164 ft, 10-in csg 170 ft, claimed show oil 1037 ft, abnd 2610 ft.

SOUTH LOUISIANA
FIRST REPORTS

Lafourche Parish—Gulf's Bowie Lbr. Co. 1, 1980 ft s and 660 ft e of NWc sec 69-15s-18e, lcn.

St. Mary Parish—Texas Co.'s State West Cote Blanche Bay 1, 20,913 ft e, 14,445 ft s of SEc of sec 20-15s-6e, lcn.

COMPLETION

Terrebonne Parish—Continental's Peters 1, Jug Lake area, 2300 ft n and 2400 ft w of SEc of sec 32-19s-15e, abnd 12,080 ft.

MICHIGAN
FIRST REPORTS

Allegan County—McKenna & Mees' Bank 1, sw sw nw 5-1n-15w, rig.

Berrien County—Matteson & Eskows' Prillwitz 1, nw sw nw 9-6s-17w, lcn.

Gladwin County—Sun Oil Co.'s Tubbs 1, c w nw sw 2-18n-2w, rig.

Kalamazoo County—R. H. Grant's Nash 1, se nw se 6-4s-10w, lcn. Smith Petroleum Co.'s Kircher 1, se sw 21-2s-9w, dr.

Kent County—Seaboard Oil Co.'s Zimmerman 1, ne ne sw 17-5n-10w, rig.

Newaygo County—Arthur Hansen's Wolford 1, ne nw nw 32-13n-14w, dr.

Van Buren County—E. W. Collin's Morehead 1, nw nw se 11-2s-15w, rig. Fisher & McCall's Solomon 1, se se ne 9-4s-14w, rig.

COMPLETIONS

Allegan County—Claude Sutherland's Ellinger 1, nw ne ne 19-3n-12w, Traverse 1568 ft, so 1577 ft, abnd 1578 ft.

Bay County—L. C. MacGregor's Country Club 1, nw nw nw 17-14n-5e, abnd 3150 ft.

Berrien County—Henry Ostrander's Brooks 1, se ne nw 1-3s-17w, Traverse 958 ft, abnd 1008 ft.

Kalamazoo County—Smith Petroleum Co.'s Taylor 1, nw se 33-2s-10w, abnd 1381 ft.

Kent County—Lenoran Petroleum Co.'s Courtad 1, nw nw nw 7-8n-12w, abnd 550 ft. Smith Petroleum Co.'s Weigele 1, nw nw sw 23-5n-9w, Traverse 2088 ft, abnd 2156 ft.

Montcalm County—H. L. Gentry's Christensen 2, c se se 20-11n-8w, Dundee 3271 ft, so 3300 ft, abnd 3380 ft.

Ottawa County—Freeman Oil Co.'s Lanning 1, se nw sw 30-5n-13w, Traverse 1647 ft, abnd 1659 ft. Lowry & Mapes' Venema 1, ne ne se 7-8n-14w, Traverse 2051 ft, abnd 2087 ft. Daily Crude Oil Co.'s Hambelton 1, nw nw nw 19-8n-13w, Berea 1193-1196 ft, 3,340,000 cu ft gas, Traverse 1913 ft, so 1914 ft, td 2025 ft, hfw, pb to 1320 ft for gas.

MISSOURI
COMPLETION

Clinton County—King et al's Vanderau 1, se ne sw 18-55n-31w, ½ mi e Hammond gas pool, base Kansas City lime 305 ft, top Mississippi 1025 ft, pb 600 ft, top Squirrel 545 ft, 2,000,000 cu ft gas.

MISSISSIPPI
FIRST REPORT

Sharkey County—Eureka Petroleum Co., W. H. Cooper 1, 1980 ft s and 660 ft w NEc 15-14n-6w, materials.

NEW MEXICO
COMPLETIONS

Chaves County—Comanche Drl. Co.'s Purcell-Sloop 3, c sw ne 15-11s-26e, elev 3540 ft, trace oil 1323-25 ft, abnd 1386 ft.

Lea County—Culbertson & Irwin's J. S. Lea-Texaco 1, c ne ne 8-19s-32e, elev 3645 ft, top anhydrite 780 ft, base salt 2765 ft, hfw and abnd 3136-51 ft. Harry W. Leonard Oil Co.'s B. B. Ginsberg 2, c sw nw 7-25s-38e, elev 3098 ft, top anhydrite 970 ft, base salt 2610 ft, top brown lime 2708 ft, top Yates 2800 ft, show o&g 3760-70 ft, salt w 3775-90 ft, abnd 3975 ft.

OKLAHOMA
FIRST REPORTS

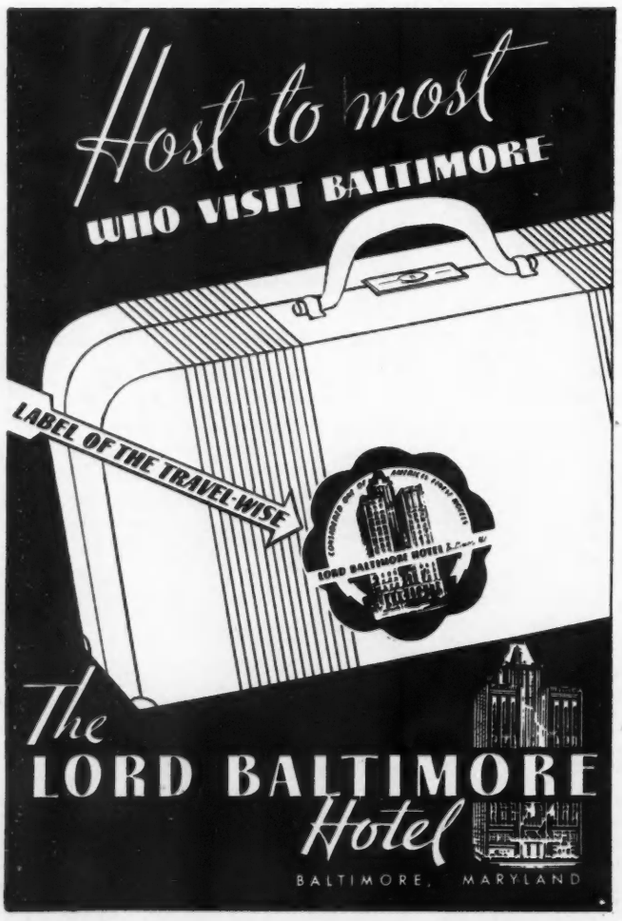
Hughes County—Nix's Warren 1-A, sec 4-6n-8e, dr.

Lincoln County—Deep Rock Oil Corp. et al's Cleer 1, sw se sw 6-15n-5e, lcn.

COMPLETIONS

Cleveland County—Smith et al's Corbett 1, c sw ne 20-6n-1e, 6 mi se Lexington, otd 6415 ft, abnd 815 ft.

Grant County—Magnolia Petroleum Co.'s Margay-Johnson 1, swc ne 29-25n-8w, 6 mi



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nw Hillsdale, top Mississippi 5842 ft, abnd 6520 ft.

Hughes County—Magnolia Petroleum Co.'s Warren 1, ne sw se 35-6n-8e, 4 mi s Spaulding pool, abnd 1264 ft.

McClain County—Patsy Oil Co.'s James 1, nw ne ne 16-5n-3e, 4 mi ne Byars, top Viola 3490 ft, td 3623 ft, flowed 960 bbls.

Pontotoc—Delaney Oil Co.'s Massey 1, se nw se 25-4n-6e, e Ada, top Calvin 567 ft, top Senora lime 766 ft, top Atoka 1542 ft, top Gilcrease 1610 ft, top second Gilcrease 1675 ft, abnd 1801 ft.

TEXAS GULF COAST

FIRST REPORTS

Harris County—Christian & Carpenter Drilling Co.'s Grisbee 1, Ogburn area, w ½ 160-ac tract, J. Picture sur, lcn.

Montgomery County—Continental's Bender 1, Spring area, H. Decrow sur, lcn.

COMPLETIONS

Ft. Bend County—Gulf's Brown 1, Juliff area, 500 ft fr w line and 480 ft fr n and s lines of 294-ac tract, Wm. Pettus sur, abnd 8500 ft.

Harris County—Mayo & Thompson's Sharp 1, Almeada area, 466 ft fr n and 466 ft fr e line of G. Haynie sur, abnd 6518 ft.

Jefferson County—Falcon-Seaboard's Powell 1, Winnie area, 330 ft fr n and w lines of 40-ac lease, W. V. Vacoco sur, abnd 9264 ft.

Washington County—Sunray's Lockhart 1, Chapel Hill area, 466 ft fr s line and 466 ft fr w line of 402-ac tract, G. Kuydendall, abnd 7000 ft.

EAST TEXAS

FIRST REPORT

Nacogdoches County—Melrose Oil Co.'s C. N. Wilson 1, 250 ft from s and 1800 ft from e lines of John Hall sur No. 263, 10 mi e Nacogdoches, abnd 1153 ft.

COMPLETION

Van Zandt County—Hickok & Harry Reynolds (was R. E. Lee's) M. L. DuBose 1 (110-acre lease), 1030 varas from w and 1782 varas from m/w/se lines of J. Stockwell sur, 3 mi sw Canton, elev 555 ft, Pecan chalk 2490-2680 ft, Austin chalk 3525-3925 ft, top Woodbine series 4404 ft, water sand 4420-4514 ft and abnd.

NORTH TEXAS

FIRST REPORTS

Baylor County—Mrs. H. B. Madden et al's J. J. James 1, 1650 ft from n and 150 ft from e lines tract, sec 150, T&NO Ry. sur A-969, sp.

Cooke County—C. E. Lynch et al's Hellman 1, 150 ft n and 1100 ft e of SWc G. C. Steele sur A-1060, 5 mi s Muenster, rur.

Wichita County—J. M. Corbett et al's F. C. Dodson 2, 2351 ft n and 150 ft w of m/s/se cor of tract, W. H. Anderson sur, A-1, lot 2, o.s. 560-71 ft, sd 1366 ft.

COMPLETIONS

Clay County—Frabor-Hodges Corp.-Sinclair Prairie Oil Co.'s L. C. Scaling 1, 330 ft s and 330 ft e of SEc lot 13, blk 2, but in G. P. Meade sur, blk 8, abnd in Caddo 5502 ft.

Jack County—H. F. Paul et al's L. M. Craig 1, 450 ft from s and 150 ft from e lines lot 3, J. B. Irvine sur A-312, abnd 312 ft.

Wichita County—J. M. Corbett et al's F. C. Dodson 1, 150 ft from e and 1731 ft from s lines of m/se/se cor of tract, W. H. Anderson sur A-1, abnd 1002 ft. Underwood Oil Co.'s W. P. Rogers 1, 1600 ft from n and 2300 ft from w lines 250-ac tract, Geo. Wheelwright sur A-320, sand 1200-06 ft, pumped 25 bbls initial.

SOUTH TEXAS

FIRST REPORTS

Bee County—Humble Oil & Refining Co.'s Ruckman 1, 466 ft from n line, 2332 ft e line 500-ac lease in Thomas Mancha sur, 7 mi nw Pettus, dr 1975 ft.

Caldwell County—John R. Black's Ed. Starcke 1, 654 ft n line, 601 ft w line 60-ac tr, Cornelius Crenshaw sur, loc. Boomer Oil Co.'s Camp 1, J. H. Bowman sur, 5 mi n Lockhart, loc.

Duval County—Landreth Producing Co.'s C. M. Robinson 1, s½ Paul Henry sur No. 116, 2 mi ne Thomas Lockhart field, loc.

Jim Wells County—Republic Natural Gas Co.'s Robert Adams 1-C, lot 16, Waldron Oil and Gas subd., GH & H sur 103, ab-192, loc. W. Earl Rowe et al's Woltara 1, block 2, I. Lang subd., Casa Blanca grant, 2 mi se Wade City, loc.

Karnes County—Gar Oil Co.'s Lyssy 1, 2116 ft nw along sw line from its intersection with San Antonio River, thence 433 ft ne at right angles in A. Hernandez sur, 4 mi n Karnes City, moving in rig.

Milam County—Fritz Fuchs' Herman Unnasch 1, Jose Justo Liendo sur, 3 mi n Thorndale, loc.

Refugio County—Clarence Norsworthy's Fox 1, 200 ft se line, 4550 ft sw line of 417.8-ac tract James Fagan sur, Ab 27, 4 mi sw McFaddin field, rigging up.

Travis County—L. M. White's P. C. Wells Estate 1, 330 ft nw line, 1190 ft sw line 700-ac tract, J. Beckam and H. Harper sur, loc.

..Victoria County—George E. Smith et al's C. Stubbs Estate 1, Rafael Manchia sur, Ab-487, 2 mi sw Victoria field, spudded.

COMPLETIONS

Bexar County—P. P. Stacey and A. C. Moore's Walsh 1, blk 6, Perez sur, abnd 418 ft.

Duval County—Mills-Bennett Production Co. and Stanolind Oil & Gas Co.'s Yates 2-A, J. Poitevent sur No. 224, ab-1105, 4½ mi nw Fitzsimmons field, abnd 4220 ft.

Gonzales County—J. A. Warnken et al's Dubose 1-A, E. G. Coffman sur, nw Hockheim, abnd 595 ft.

Live Oak County—George M. Church's Wuthrich 1, John Turner sur, 7½ mi w Three Rivers, abnd 1212 ft.

San Patricio County—Tom Graham Oil Co.'s Coates 1, sec 28, George H. Paul subd., of the Welder Ranch, abnd 5830 ft.

Starr County—Hervert Aid's A. Ramirez 1, share 13-C, porcion No. 71, abnd 750 ft.

Victoria County—Transwestern Oil Co.'s McFaddin 1-G, J. Vairin sur, Ab-123, 2 mi nw McFaddin field, abnd 6710 ft.

Webb County—R. D. Noble, and T. W. Cash et al's Row & Bonham 1, sec 1698, Texas Mexico Railway Co. sur, 6 mi nw Carolina-Texas field, abnd 2518 ft.

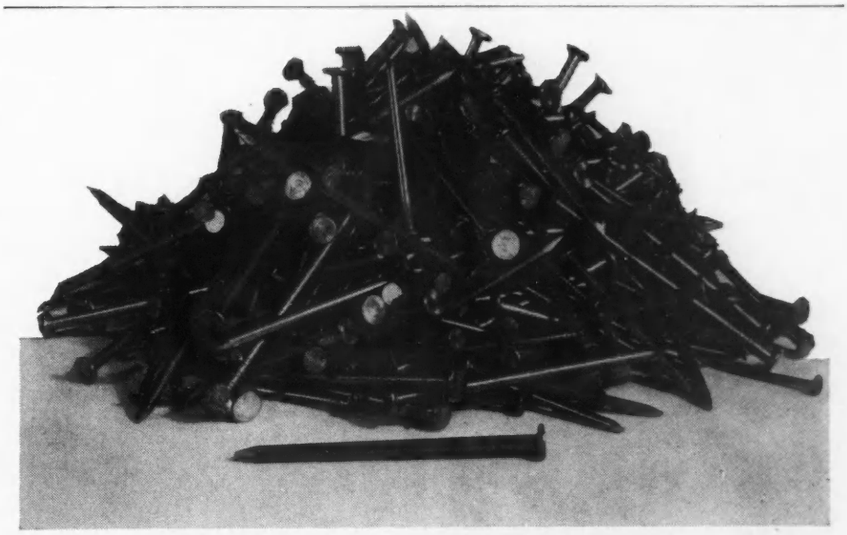
Wilson County—Jake Alterman and George Collom's Voges 1, tract 5, Alterman and Collom subd of Mary Voges 1339-ac tract, L. Menchaca Grant, 2½ mi sw Poth, loc, abnd.

West Central Texas

FIRST REPORTS

Hamilton County—A. J. Caldwell et al's Jones 1, 1002 ft from ne & 150 ft from se lines W. H. Crowder sur, dr 220 ft.

Jones County—Thos. D. Humphrey et al's H. C. Hall 1, 330 ft out of sec of 158-ac lease, T&P sec 1, blk 17, elev 1664 ft, dr 1910 ft.



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NOTES FOR THE Equipment Buyer and User

Draw Works

CARDWELL MANUFACTURING COMPANY

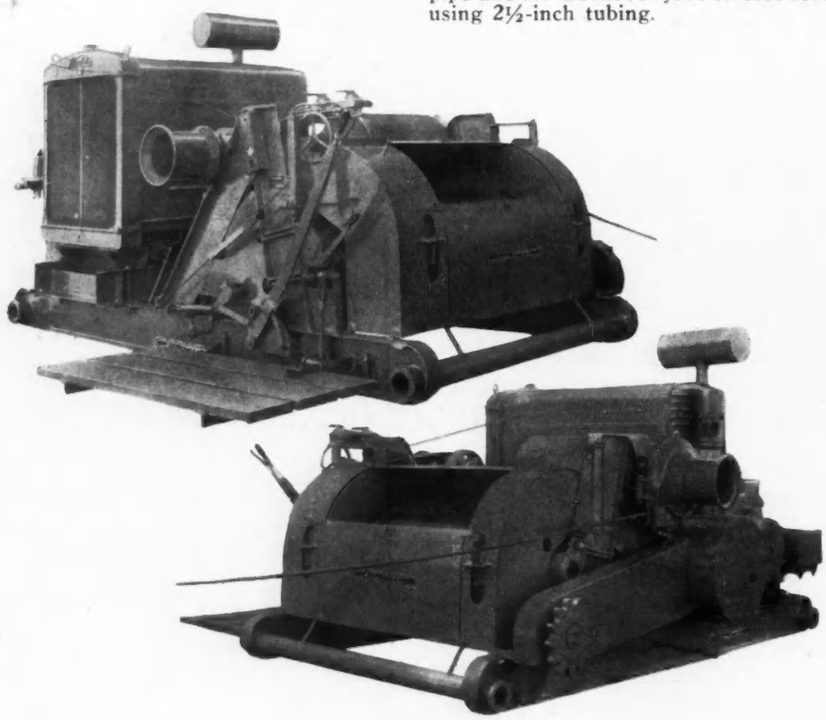
Cardwell Manufacturing Company, Wichita, Kansas, announces a new addition to its line, a Model L slim hole or workover draw works developed especially for slim-hole drilling and workover jobs. This new, light-weight draw works, driving from a hydraulic transmission through a "Cardwell speed drive," operates just like a steam rig. The entire range of engine power is constantly available at maximum speed without shifting gears.

The hydraulic transmission sprocket drives to an auxiliary shaft on which three "Cardwell" built friction clutches are mounted. The "Hi-Lo" drive, consisting of two of these clutches with sprockets driving to the countershaft, makes it possible to instantly double the line speed. The third friction clutch operates the rotary table drive and is supplied with clutch brake for stopping the table.

Air controls operate the two "Hi-Lo" friction clutches, rotary table drive friction clutch and the countershaft brake.

Either brake of the new, dual, fully equalized, single adjustment brakes will automatically hold the full capacity load should the other brake fail.

Model L draw works is for rotary drilling to 4500 feet with 3½-inch drill pipe or to 3500 feet with 4½-inch drill pipe and for workover jobs to 8000 feet, using 2½-inch tubing.



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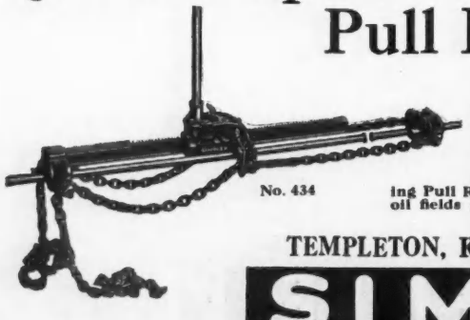

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Rotary Hose

THE CONTINENTAL SUPPLY COMPANY

Two types of rotary hose for use in rotary drilling operations, distributed by The Continental Supply Company of Dallas, Texas, now feature the incorporation of a built-in, leak-proof coupling.

This hose and coupling, according to the announcement, is regarded as an outstanding development in the history of rotary hose manufacture. Available in both "Super Rough Rider" and "Rough Rider" brands, the hose features a coupling that is an integral part of the product.

The built-in coupling eliminates the necessity of flanges, nozzles, bolts, nuts, clamps, or hydraulic nipples. Made of the toughest alloy steel obtainable the coupling has been shown to be leak-proof in thorough field tests.

Literature is available from The Continental Supply Company.

Tractor

J. I. CASE COMPANY

J. I. Case Company, Racine, Wisconsin, announces an addition to its line of industrial tractors, Model "DI," in which features previously incorporated in Case industrial tractors are retained, and numerous new features added.

Engine horsepower has been increased and can be operated over a wide range of speed with either a hand or foot-operated governor control. Fundamental improvements have been incorporated in the lubrication system. In addition to pressure oiling to crankshaft, connecting rod and camshaft bearings, valves and valve rocker arms are positively lubricated by pressure with an oil lead to the governor housing. The clutch pilot bearing and all clutch operating parts are also automatically lubricated. Drilled passageways in the engine block eliminate all inside oil pipes and prevent the possibility of lubrication failure through loose connections. The radiator is provided with an adjustable shutter and protected by a sturdy guard.

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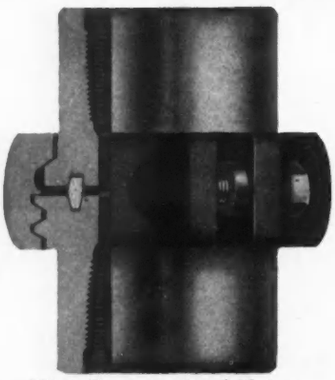

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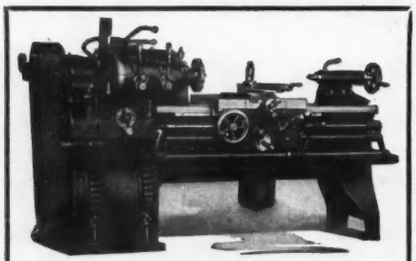

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NOTES FOR THE Equipment Buyer and User

tained with four forward speeds and one reverse, giving a greater range of travel speeds. Increased life is incorporated through improved oil seals, permanent inside rear axle bearing adjustments and other refinements in design.

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R. A. Hill Manager for Regan in Mid-Continent

R. A. (Bob) Hill has been appointed manager of the Mid-Continent Division of Regan Forge & Engineering Company. Hill attended Rice Institute and has been associated with the oil industry for the past 20 years, having been employed in the drilling, production, pipe line, refining and marketing divisions of various oil companies.

In 1928 he was made Mid-Continent sales representative for A. M. Byers Company. In 1931 he was made division manager of Broderick & Bascom Wire Rope Company, with headquarters at Houston, in which capacity he remained until his recent appointment with Regan Forge & Engineering Company. His headquarters will be in Houston at the offices of Regan Forge & Engineering Company, 1502 Maury Street.

W-K-M Company Expanding Foreign Sales Effort

W-K-M Company, Houston, Texas, announces a major expansion program for export distribution of the company's own line of manufactured products and those lines of other manufacturers on which it has the exclusive export distribution.

This announcement is made coincidentally with the announcement that W-K-M Company has been appointed exclusive export distributor for Hunt Tool Company, manufacturers of the Hunt wire-line core barrel, soft and hard-formation core heads, welded-in blade bits, low-pressure gas burners, steam valves, low-water alarms, and boiler gauge cocks.

W-K-M Company also is exclusive export distributor for Houston Engineers' casing cutters, reversing tools, spears, overshots and taps, mills, substitutes and rotary shoes; Rig-A-Lite's complete derrick lighting strings, water-proof and regular; Mudrite Products Company's "Lo-Vis" crystals and chemical mud conditioners; and Garrott Brass & Machine Company's turbo-generators, bug fans, safety cable slides, and steam turbines.

In line wtih the company's export plans, W-K-M is materially increasing its man-power for foreign representation.

T. M. Smith has recently returned to Houston from a flying trip through Trinidad, Colombia, and Venezuela. He has been a member of the W-K-M staff in United States fields for several years, and has to his credit 20 years experience in the oil country, including a long period of service in Mexico.

Paul May, full-time W-K-M repre-

T. M. SMITH

PAUL MAY

NOTES FOR THE Equipment Buyer and User

G. M. STEWART

O. D. SMALL

sentative in Venezuela and Trinidad, returned recently to his territory following a trip to Houston for a conference in connection with the company's expansion program. He went to South America more than a year ago for a study of drilling conditions and the equipment market after many years of experience in drilling and production work in United States fields.

G. M. Stewart, export manager for W-K-M, left Houston the last week in 1939 for an extended tour of Argentine fields. He came from his export headquarters in New York to Houston to attend the company's conference.

O. D. "Pete" Small is scheduled to leave Houston within the near future for an extended trip to the Dutch East Indies, visiting the individual fields in Borneo, Sumatra, Java, and other active oil areas in that part of the world. Small is among the oil industry's most widely traveled sales representatives. He spent several years as an engineer for drilling and producing companies in Mexico and South America, and last year made an 11-month tour which took him into even the most remote oil areas of every South American country. This, added to previous travels in Europe, has made him a ranking cosmopolite.

In addition to these individual representatives, W-K-M is maintaining a full force at its export office at 74 Trinity Place, New York, which was established more than 15 years ago to serve foreign trade.

Worthington Pumps to Handle Cargo on New Atlantic Tanker

The Atlantic Refining Company has awarded to the Worthington Pump and Machinery Corporation the contract for the cargo discharge and circulating pumps for a 19,405-ton all-welded tanker to be built for The Atlantic Refining Company at the Sun Shipyards, Chester, Pa. The three 300-horsepower discharge pumps will be of the centrifugal, deep-well type, driven by 2300-volt ex-

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The OTIS REMOVABLE TUBING SAFETY VALVE is also a sure safeguard against disaster—disaster caused by your well running wild due to damage or failure of surface controls. Wells in townsites, out in water, in dangerous foreign fields, or wells with unusually high surface working pressures need the protection the OTIS REMOVABLE TUBING SAFETY VALVE affords.

WRITE OTIS TODAY
PRESSURE CONTROL
INCORPORATED
DALLAS, TEXAS

plosion-proof motors. Combined capacity will be 630,000 gallons an hour, making it possible for the vessel to unload cargo in approximately 11 hours, about one third the usual discharge time for a vessel of this size. The main and auxiliary circulating pumps will have a capacity of 522,000 gallons an hour.

Bethlehem-International Moves Tulsa Sales Office

Bethlehem-International Supply Company is moving its Tulsa sales office from 618 National Bank of Tulsa Building, to 805 East Archer Street. Manufacturing and accounting departments have had offices at the latter address, and through remodeling and additions space has been provided for the sales department.

Lincoln Arc Welding Foundation Announces Big Award Offer

The James F. Lincoln Arc Welding Foundation has announced a program of scientific study, which will culminate in awards of $200,000, to be divided into 458 parts. These have been established for studies bringing out benefits of a social, economic or commercial nature.

Participation is open to anyone who plays any part in bringing about progress in the executive, design, fabrication, manufacture, construction or maintenance phase of industrial product or structure development. One author or a group of authors may submit a study. The program will continue from January 1, 1940, to June 1, 1942. Inquiries should be addressed to the secretary of the foundation, Cleveland, Ohio.

The first grand award, $13,700, will be paid for the best progress report submitted. There will be three main program awards of $10,000, $7,500 and $5,000 each. Other awards are by classifications, divisions and honorable mention, the last of which will receive $100 each.

Houston Belting & Supply Represents Raybestos-Manhattan

The Manhattan Rubber Manufacturing Division of Raybestos-Manhattan, Inc., has announced appointment of Houston Belting & Supply Corporation, 1115 Austin Street, Houston, Texas, as a distributor. The division's direct factory representatives are E. L. Alderson and R. I. Hoskins, who will collaborate with Houston Belting & Supply Corporation's personnel, consisting of J. O. Long, J. T. Jenkins, and D. Y. Wilson.

McKay "Certified" Stainless Electrodes with Ryerson

Joseph T. Ryerson & Son, Inc., of Chicago, has recently become distributor of McKay Certified Stainless Steel Electrodes. These highly specialized electrodes, covering the whole range of analyses encountered in stainless-steel welding, are stocked by all the Ryerson branches, including Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, and Jersey City, as well as the central plant in Chicago.

Wrought Iron

A 97-page, second edition, treatment of the manufacture, characteristics, and application of wrought iron, written by James Aston and Edward B. Story, metallurgists for A. M. Byers Company, represents an enlargement and revision of an earlier work. The 12 chapters include many illustrations, photomicrographs, and tables of analyses. The discussion is built upon four phases of the product: historical development, methods of manufacture, testing and standards, and characteristics of strength and ductility as they affect forging, welding and bending. The book may be obtained for $1.00 from A. M. Byers Company, Pittsburgh, Pennsylvania.

Cutting Torches

Bastian-Blessing Company, 242 E. Ontario Street, Chicago, Illinois, has made available a 36-page pocket catalogue describing its complete line of welding and cutting equipment, the catalogue describes latest equipment and gives recommended tip sizes for welding various metal thicknesses and complete data on tip sizes and gas pressures for cutting iron and steel from 1/16-inch to 18 inches thick. New items listed for the first time are: Rego KX cutting torches with stainless steel head and tubes, Rego GXH multiflame tips for hard surfacing and general heating, LGX and XGX extra length welding torch handles for special applications.

Houston Ready Cut Official Dies Suddenly on January 1

Harold F. Brown, 51, vice president of Houston Ready Cut House Company, Houston, died suddenly at his home on January 1, and was buried at Houston the following day.

It's a Fact — Johnston

HIGH UP ON A PLATEAU NEAR BIG PINEY, WYOMING, A WELL WAS BEING DRILLED LAST WINTER WHEN—WITHOUT KNOWING IT—THE CREW PENETRATED A HEAVY GAS FORMATION AT ABOUT 1700 FEET. LATER WHEN THE WELL WAS STANDING IDLE IT BLEW OUT...AND CONTINUED BLOWING AT THE RATE OF 40 MILLION CUBIC FEET OF GAS A DAY, CUTTING ABOUT 300 BARRELS OF WATER. IN THE SUB-ZERO WEATHER, THE WATER FROZE ALMOST THE INSTANT IT REACHED THE SURFACE, QUICKLY TURNING THE RIG INTO A SOLID TOWER OF ICE ALMOST A HUNDRED FEET WIDE AT THE BASE. IT WAS NECESSARY FOR THE CREW TO CUT A FIFTY FOOT TUNNEL THROUGH ONE SIDE OF THE ICE CAKE THAT HAD FORMED AROUND THE RIG IN ORDER TO REACH THE RIG FLOOR AND CAP THE WELL...ALL BECAUSE OF AN UNKNOWN ZONE!

UNKNOWN GAS ZONES CAN OFTEN CAUSE A LOT OF TROUBLE, BUT THE REALLY EXPENSIVE FORMATIONS ARE THE GOOD PRODUCING SANDS YOU DRILL THROUGH WITHOUT KNOWING IT. A JOHNSTON FORMATION TEST—AS SIMPLE AND EASY TO MAKE AS CHANGING A BIT—WILL TELL YOU BEFORE CASING IS SET THE EXACT PRODUCTION CHARACTERISTICS OF EVERY SAND YOU DRILL. THE JOHNSTON TESTER WILL GIVE YOU—ACCURATELY AND AT NOMINAL COST—DEFINITE INFORMATION THAT WILL HELP YOU DEVELOP YOUR HOLDINGS MORE EFFICIENTLY, SAFELY AND ECONOMICALLY...KNOWING BEFOREHAND THAT EVERY STEP YOU MAKE IS THE RIGHT STEP FOR BEST DEVELOPMENT!

SEND TODAY FOR YOUR COPY OF JOHNSTON ENGINEERING BROCHURE 31, WHICH TELLS ALL THE IMPORTANT FACTS ABOUT ACCURATE, SAFE, DEPENDABLE JOHNSTON TESTING METHODS. THERE'S NO OBLIGATION AT ALL!

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Submitted by: Miss Hazel Thaxton, Los Angeles, Calif.

FIVE DOLLARS ($5.00) WILL BE PAID FOR EACH INTERESTING OR UNUSUAL FACT CONCERNING THE PETROLEUM INDUSTRY (EITHER IN THE UNITED STATES OR ABROAD) WHICH IS USED IN THIS SERIES OF JOHNSTON ADVERTISEMENTS. SUBSTANTIAL PROOF MUST ACCOMPANY EACH CONTRIBUTION. WHEN TWO OR MORE SIMILAR FACTS ARE SENT IN, THE AWARD WILL BE GIVEN TO THE FIRST ONE RECEIVED ...

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"Servicing Mid-Continent and Gulf Coast"

"WHY SET CASING BEFORE YOU KNOW!"

Squeaks from the Bull Wheel

Dumb Dora

Aren't the stars numerous tonight?
Yeah; and ain't there a lot of them?

Nothing Doing

Sorry, old man, but I'm looking for a little financial succor again.

You'll have to look further this time. I'm not the financial sucker I used to be.

Magic

Two men named Wood and Stone were standing on a corner. A pretty girl walked by. Wood turned to Stone. Stone turned to Wood. Then they both turned to rubber and the girl turned into a drug store.

Doubtful Possession

Hey, you, is that your car?

Well, officer, since you ask me, considering the fact that I still have fifty payments to make, owe three repair bills, have not settled for two new tires, and don't know when I will be able to, I really don't think it is.

Too Formal

People stood gazing toward the ship that was sending up signals of distress. One of them, an elderly lady, was becoming very concerned. "But can't something be done for them?" she asked a life saving official.

"Yes, madam, we'll send a line for the crew to come ashore."

"Must they have a formal invitation first?"

Successful Technique

Mother, are you going to get that new coat you want?

I'm afraid not, dear.

Have you tried throwing yourself on the floor and kicking with your feet, and yelling, like I do?

On His Own

Hey, where do you think you're going?

Be easy on me officer. This is the first time I haven't had my wife along to tell me.—Jokesmith.

Disguise

"Yep, I had a beard like yours once, but when I realized how it made me look I cut it off."

"Well, I had a face like yours once, and when I realized that I couldn't cut it off I grew this beard."

Good Enough

"I was just thinking, Pat, that you would make a fine monkey if you had a tail."

"I was just thinking meself that you would make a fine monkey without any alteration at all."

Back Fire

"Do you know that George Washington was at the head of his class when he was your age?"

"Yes, but he was President of the United States when he was your age, Pop."

Start of Nice Evening

"I s'pose you dance?"

"Certainly. I love to."

"That's even better."

And How Late?

"Sorry, honey, I'll be awfully busy at the office and can't be home until late."

"Can I depend on that?"

Playing Safe

"The jury having acquitted you of the charge of bigamy, you are free to leave the court and go home."

"Thank you, your Honor, but I want to be on the safe side—which home?"

Not So Real

"Here's a lovely doll. You lay it down and it closes its eyes and goes to sleep like a real baby."

"Have you ever put a real baby to sleep, girlie?"

Helpmate

He—I don't see why this tandem should seem so hard to pedal.

She—Well the only thing I don't like, dear, is the way these foot rests keep moving up and down.

A No. 1 Recommendation

Have you any one in this court who will vouch for your character?

I have, your honor—the sheriff over there.

Why, your honor, I don't even know the man.

There you are, judge. I've lived in this county more than ten years, and the sheriff doesn't know me yet. What better character witness do you want?

Ahem

Say, look at the grotesque insignia on the side of that bombing plane.

Shhh; not so loud. That's the squadron commander looking out the window.

Raising Hob

"What is the greatest water-power known to man?"

"Woman's tears."

Doesn't Indulge

"Shall we join the ladies?"

"Thank you, but I never smoke."

Catty

The two dear women met in the street.

"My dear," said one, "your hat is becoming—."

Then as the other began to purr, she continued: "- quite a means of identification, isn't it?"

The Tell Tale

The customs official viewed the woman with suspicion. Then he addressed her: "Madam, you are not allowed to bring in a dog."

"I have no dog."

"Then, madam, am I to conclude that the tail hanging below your coat is your own?"

Mister Grandma

"Now that I have had my hair bobbed, I don't look so much like an old lady."

"No. Now you look like an old gentleman."

Absolutely

"What's the latest thing in clothes?"

"A woman keeping an appointment."

Knows Her Own Bomb

"Have you heard the story that's going around about Eunice?"

"Heard it? Why, honey, I started it."

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& COOLERS
GOTT Water Cans are the practical way to keep drinking water cool for long periods, protected from impurities and always handy to the job. Snug fitting large removable top, strongly built to withstand rough usage. GOTT Water Coolers have extra large covers and a handy non-leaking push button faucet. Your Supply Store has them, get one today! . . . . . .
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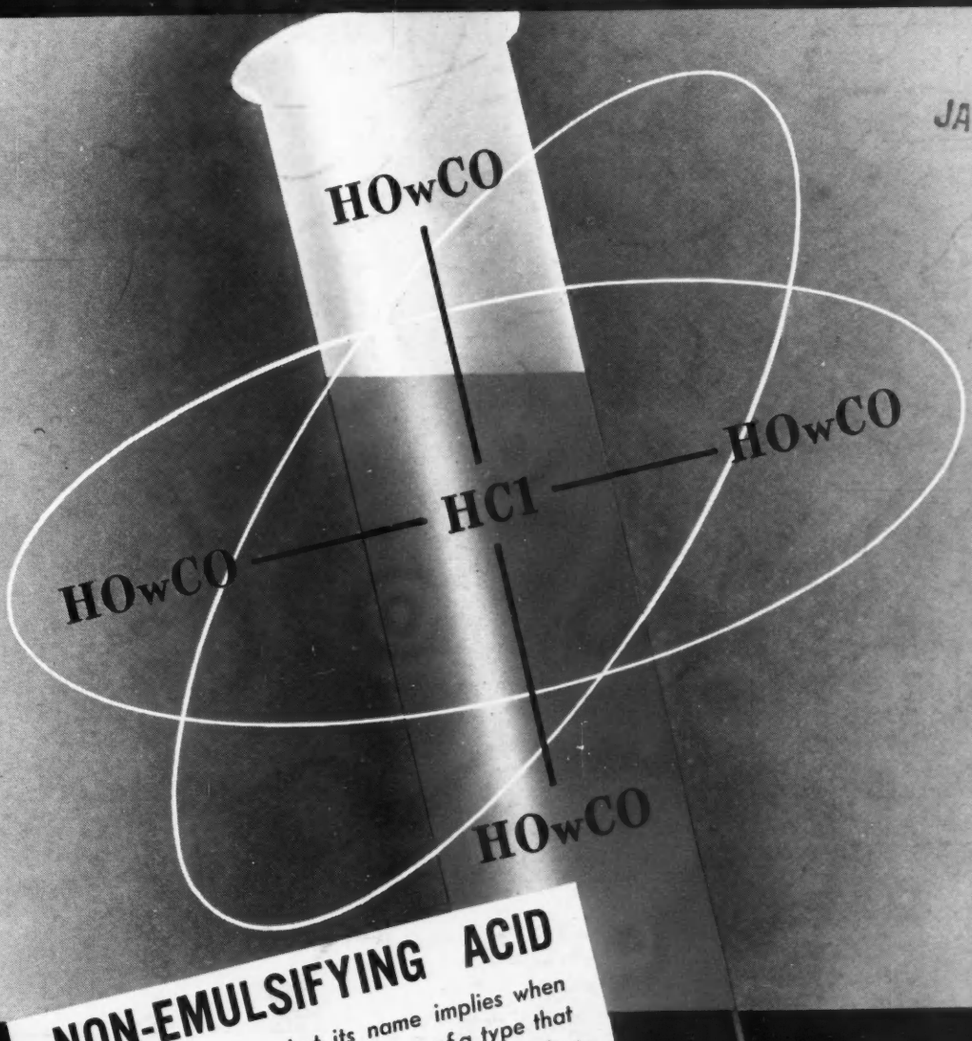

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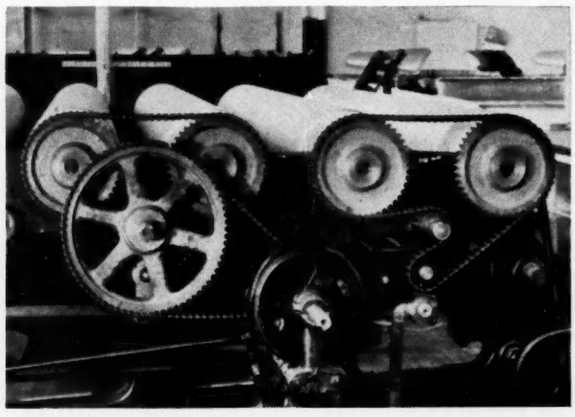

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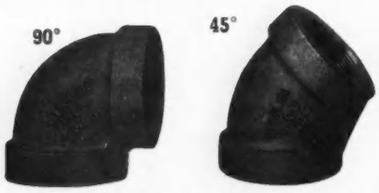

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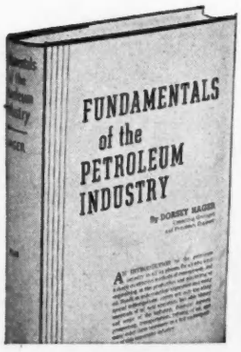

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WITH THE EDITOR

Submergence and Fluid Level in Pumping Wells.

IN any pumping well there are four factors determining the amount of fluid produced. One of these, displacement of the pump, is purely a mechanical problem. Another, reservoir pressure, is something you can do nothing about.

But the other two, fluid level and submergence of the standing valve, are factors which can be utilized in realizing maximum profitable production, if you know how. And although it is to the interest of the operator to keep both the fluid level and the casing head pressure at a minimum, there are other considerations which enter into efficient pumping.

An article titled "Influence of Submergence and Fluid Level on Pumping wells," which will appear in an early issue of THE OIL WEEKLY, deals with these factors. It discusses static heads, gas coming out of solution, prevention of slippage and channeling by application of back pressure, control of water in establishment of fluid levels, cases in which a change from the inverted to standard type pump, and vice versa, is indicated, and construction of gas anchors.

The author explains that submergence becomes of increasing importance as a well ages, notwithstanding many operators fail to recognize this and leave the long original anchor intact for several years after its usefulness has passed. Regarding lengthy strings of perforations, he says they are not necessary, as sufficient opening is attained if the combined area of the perforations is only four times that of the standing valve opening.

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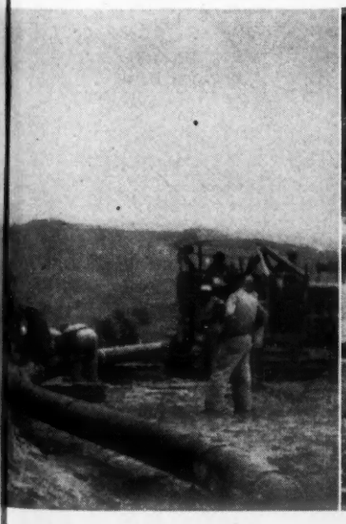

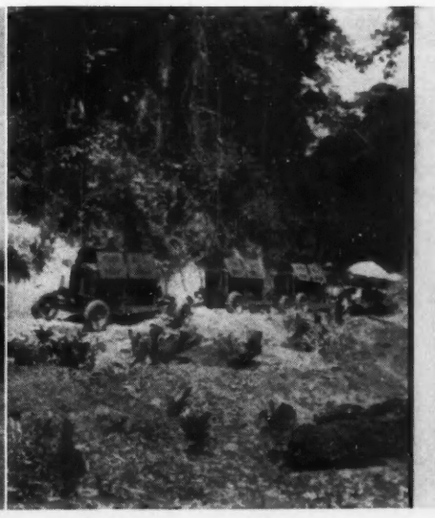

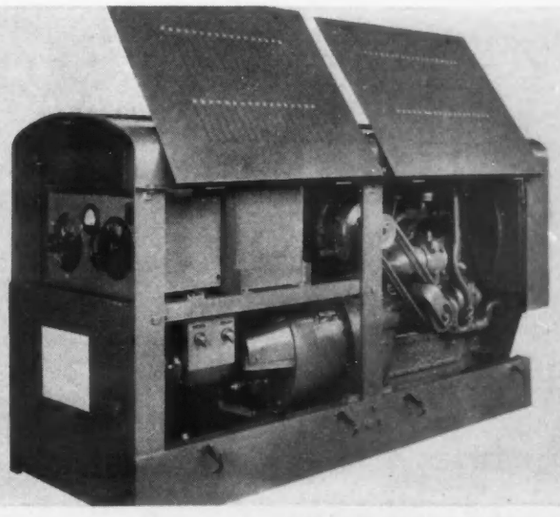

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LETTERS TO THE EDITOR

East Texas Proration

DEAR SIR:

Referring to the two articles on East Texas proration in your December 25th issue, it occurs to me that the writers of these two articles have a slightly wrong slant on the data and arguments presented in the December 15th state-wide hearing.

Mr. Speller's formula was challenged chiefly on the 20-barrel-minimum-per-well allocation feature; he presented definite reasons for the inclusion of this minimum:

First—It acted as a buffer *against engineering measurement error* depriving one lease of its rightful production, or unfairly increasing the allowable on another lease. (This error is admitted to be as high as 50 percent on some present sand thickness allocations).

Second—It is an encouragement towards complete development of an oil-producing property. It was Mr. Speller's opinion that the more wells drilled the more oil recovered.

Third—Any proration formula in as large a field as East Texas, will, necessarily, discriminate against some producers, and a fair minimum allowable will counteract this discrimination.

As an illustration of this last point, Mr. Speller showed that if the 20-barrel minimum was removed from the present formula, east side and west side marginal wells would be permitted to produce in many instances only a fraction of a barrel per day, and fairway wells would be permitted to produce in excess of 100 barrels per day. This would be true of the Sinclair formula, with the exception of a slightly higher allowable to the west side. *Is it not easily apparent why companies with leases principally in the fairway are eager to reduce the minimum allowable per well?*

Mr. Speller stated that his formula would be inequitable without the 20-barrel minimum, and that in many instances east-side wells would get only a fraction of a barrel per day; they would be drastically discriminated against by virtue of very slow returns on original investment. Mr. Gardescu and Mr. Speller seem to be of a like mind on this point.

The Speller formula appears to me to be the most reasonable proposed to date by any engineer. The west-side wells should be given a producing adjustment to compensate for early drainage. It is admitted that there is about the same amount of oil in place under fairway leases today as there was initially. Certainly, it is only reasonable that any operator be permitted to produce enough to allow him to continue in business; until the Marginal Well Law is finally adjudicated by the Supreme Court, the East Texas minimum is 20 barrels, and the attorney general has so advised the railroad commission.

I am not an engineer, and I do not charge, nor would I infer that engineering is to the slightest extent determined by subsidy, but it would be difficult to convince an experienced driller or producer that the conditions in the pay, or below the producing depth of the producing well is other than a guess, indefinite and difficult of proof. For instance, when engineers are cornered and pressure is applied, they will admit that the sand allocation to many areas in the East Texas field is subject to a 50 percent error.

I do not know whether or not engineers reserve the right, or claim the professional prerogative hereto accorded only to lawyers —to serve their employers to the best of their ability. I have not heard of any of them claiming X-ray eyes, nor the ability to see the bottom of a slanting drill hole 3800 feet deep. The engineer has made himself a place in the industry, and their services are invaluable in the production of oil and gas; they can and will continue to save many dollars for their employers.

W. F. KNOX,

412 W. Ferguson St.,
Tyler, Texas

No Shift in Illinois

DEAR SIR:

I saw an article by John Pugh, president of the Independent Oil Producers Association of Illinois, in which he states that there has been a remarkable change of sentiment, favoring oil-control legislation in Illinois.

I don't know on what Mr. Pugh bases his opinion. It sounds like wistful thinking. I am very frank to admit that in the oil-producing areas he is wrong, as our organization fully expects to stop any oil control legislation in 1940, and we are pointing ahead so that there will be no oil-control legislation at all in this state that will in any way eliminate the independent oil men who are striving to develop the state.

The campaign of The Carter Oil Company (the main proponent of oil-control legislation in Illinois), in our opinion, will not be successful, and while other companies string along with the Carter, there is by no means an unanimous acceptance of a conservation program even by majors.

The Illinois Oil Producers' Equity Association represents by far the greatest majority of independent oil producers, refiners and pipe lines, and we are not going to be pushed off the map. In fact, we are getting stronger every day.

Political conditions in Illinois differ from other states. There is no major oil company domination here, as in Texas. The oil business, while it has grown larger than the coal business, does not represent more than 1/30th of the income of the state. It is not similar to Texas, Oklahoma, or Kansas, where the oil industry leads all others, and the people here are not slavishly influenced by the major oil companies, but on the other hand, they gladly cooperate with the independent oil companies, as against the majors. Our survey of the situation convinces us that there is not likely to be any proration this year, and the chances are excellent that there will be none in 1941. In fact, we believe we can keep proration out of this state indefinitely, and that is our aim. We are not against conservation, but when conservation is used as a stabilization measure by a small group to destroy the independent producers, refiners, and marketers, then we are against it, and will fight to a successful conclusion.

DORSEY HAGER,
Technical Adviser.

Illinois Oil Producers' Equity Assn.
Centralia, Illinois.